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ERRORS IN DENTAL EDUCATION.

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"We can make majors and officers every year, but not scholars."
—Anatomy of Melancholy.

The subject under consideration has been discussed from varied viewpoints since the first dental school was conceived. As through evolution generally, discussion of dental education has been improved by logical analysis and experience.

It would seem strange in this day of educational advancement were dentistry not to keep pace with other departments of science. Action and reaction is a law of progress. As prosperity follows depression in the business world so does progression follow retrogression in the educational world. These variations result from the lack of proper application of general principles. The same law obtains in regard to professions. At present the question arises whether there has been progress in dental education in the last three decades or whether the profession is passing through a period of stress, in which arrest of development must occur.

The following opinions of editors of dental journals tend to indicate the last probability. One says, "I have the greatest difficulty in getting for my journal material that has not been used over and over again many times." Another, "I believe Dr. Sudduth was correct when he said twenty years ago that the dental profession has written itself out." The third, "It seems to me that the dentist is in a groove, that there is nothing new to write about."

Dr. James Truman in an editorial, "Has the Art of Filling Teeth Progressed in Fifty Years?" (*The International Dental*

Journal, April, 1903, page 309), discussing the subject in a fair and unbiased manner, summing up asks, "Has this art, therefore, really made any progress since 1855? The superficial observer will be surprised at the question and yet if the writer were to answer by the assertion, it has not, the astonishment would probably be intensified. The basic methods of filling teeth, shaping of cavities upon the mechanical principles to retain the filling have not materially changed in fifty years, notwithstanding the earnest talk of 'extension for prevention.' The good men of 1850 taught the same thing, but had no catching title as a name for it. The real progress made in half a century has been in matters of detail and the invention of appliances. With the rubber dam, clamps, separators, engine, electric and power mallets, and the use of electric currents there is not a tithe of the skill required to-day to insert a filling that was then demanded. Indeed, given good gold and appliances named, he must be a blundering mechanic who cannot make a filling worthy the best efforts of the early masters. All the talk regarding extension for prevention that we hear so much of to-day is simply throwing dust in the eyes of the modern operator to prevent his seeing the records of past history and reading therefrom that practical results, whether through the use of non-cohesive or cohesive gold, are worth more than a whole decade of theorizing."

Dr. Kirk (*The Dental Cosmos,* Jan., 1903) says, "The development of the art (dentistry) has been so thorough that though we may not say future progress is impossible, yet the multiplicity of methods and devices at our command would seem sufficient in number and adequate in kind to meet all exigencies of practice for years."

Dr. Carlton (University Training in Dental Education) in addition to the above says, "We may add a wheel or two here and there simply to improve in a slight degree the mechanism, but it certainly seems that the machinery and tools are nearly perfect."

Plate work has not advanced in the past forty or fifty years. Indeed, it is questionable whether or note it is possible to improve the methods of that period. The average dentist will ask about crown and bridge work. In reply, I ask, has the dentist studied the pathology of the alveolar process? Does he know that the

alveolar process was intended to support the root or roots holding one crown; that because of its sensitive nature, bands under the gum margin are not tolerated (the fact that occasionally bridge work lasts for some years does not disprove the rule); that excessive expansion of the dental arch for the correction of irregularities of the teeth without extraction results from lack of broad education? The province of the dentist should be to prevent the collection of germs in the mouth, rather than to assist their formation. Porcelain inlays are not an advance in dentistry; there is no cement that will hold them, and no matter how careful one may be in obtaining the exact color, disease and age will change the color of the tooth.

The dentist stands upon a cusp of a molar tooth and sees only teeth in the "milky way" and in the aurora borealis. Diseases beyond the teeth are an unknown quantity. In the past twenty years I have written over seventy papers based upon original research. No one has taken enough interest in original research as to the etiology of irregularities of the teeth or of interstitial gingivitis either to confirm or dispute my findings. Not a single article has ever been written upon the pathology of either subject. It is notorious that in proportion to the number of practicing dentists, very few journals are taken, much less read. Students do not buy books. On the other hand, let a new theory or principle be advanced in other departments of medicine and its members can and do discuss it off-hand intelligently. Why this difference? Follow the course of instruction and the problem is soon solved.

What the controversy may have been when the first dental college was established sixty-four years ago is of little interest to us now, but certainly the trend of the medical profession was then to the opinion that the practice of dentistry was purely mechanical, differing entirely from the practice of medicine and without relationship. All will agree on that point. I am glad the dental college was established, for I believe that it was necessary that our specialty should take up this particular line of work (the mechanics of dentistry) and pursue it to the end. The mechanics of dentistry, like all mechanics, are narrow and limited. The highest perfection in the mechanics of dentistry, excepting in

the matter of a few details, was reached more than thirty years ago.

The establishment of a separate college conferring a separate degree narrowed dental teaching, and gradually but surely developed the mechanics of dentistry to the limit. The result is that the profession, if it may be called such, views the lesions of the mouth only from the mechanical side. Students in most dental schools are taught that mechanics and operative dentistry are the principal departments and that the other departments are of minor consideration, while the opposite is true. The result is that the student neglects these less emphasized but more important studies for branches seemingly likely to yield him most money after graduation. The excuse offered by the dental student for not doing research work, writing papers, reading journals and books, is that "he is either too busy or tired." Would not this be true of other professions judging by their hours of work?

Imagine two students of equal ability; one studies medicine, the other dentistry. After the completion of their respective courses the graduate of medicine has broadened his knowledge of subjects generally, while the graduate of dentistry has narrowed his. The tendency of the teaching is toward the mechanical rather than the scientific. This then is the reason the dentist does not take journals, buy books and read them, do research work and write original papers.

The "touch system," as J. P. Gray calls it, has developed to such an extent and the teachers and schools have become so impregnated with it, that embryology, evolution, the nervous system, anatomy, physiology, chemistry, materia medica, therapeutics, physics, etc., are all brushed aside as of minor importance. The "touch system" has become a monstrosity in dental colleges.

Evolution and degeneration go hand in hand. One cannot exist without the other. Monstrosities are sometimes born without skulls and brain, a reversion to the pre-vertebrate type. There are men gone daft on the "touch system." They imagine, as some have told me, that they have an eye on the end of the finger, that they see and feel the slightest inaccuracy or imperfection, such delicacy of touch have they developed. This degeneration is again a return to the pre-vertebrate type aptly demonstrated in the snail and lobster, whose eyes are located at the

end of the antennæ. What will become of the "touch system" and present college methods when a new cement is discovered to take the place of gold?

From the mechanical standpoint, dentists are restless, ambitious individuals. All are trying to advance mechanics. Very little more can be accomplished, yet the inventive mind is still at work upon the impossible. Porcelain inlays, artificial bridges, buttoned to the roots of the teeth, removable bridges and teeth, partial or entire dentures, depending on two or three roots for support, implanted teeth, local applications in the treatment of constitutional disease, even the fillings by the present methods, are but partially successful operations. The average dentist has very little conception of the systemic diseases in relation to the teeth, for his instruction has been limited to a consideration of the most plausible theories of local causes.

The state, national and international congresses, to be successful, are obliged to conduct clinics. These grow more popular each year. The science of dentistry is almost a failure. The side shows (the tooth fillers and plate makers) and the camp followers (those with trinkets to sell) are the interesting attractions. The profession has been entertained *ad nauseam* by the same continuous performances for the past three decades. At every society meeting dentists are content to listen to the same antique nursery rhymes concerning the preparation of root canals, the treatment of alveolar abscess, the choice of filling material, oral hygiene, etc., heard over and over again for decades, and seem to enjoy them, applauding the speaker with as much energy as though it was all original work, heard for the first time.

The insertion of a gold or amalgam filling, or the filling of a root canal by a recent graduate, creates as much enthusiasm as the monkey in a new uniform, performing the same old tricks, does among the children. William H. Trueman, in his report of the ninth annual meeting of the National Dental Association, held in Buffalo, says (*The International Dental Journal*, 1905): "Eighty-five clinics were on the program for each day. One hesitates to criticize, especially after seeing an exhibit, that seemed too trifling for notice, surrounded hour after hour by an interested crowd; yet, looking over the list, an impression remains that a judicious pruning would have done no harm; not that there was

anything objectionable, but rather a lack of novelty and importance in many of the table clinics and in some of the chair clinics. It seems a useless waste of time to demonstrate matters that have been accepted facts for many years."

Clinics, except those in which something new is presented, belong to the past. They originated when there were few or no dental colleges. Then dentists educated themselves or picked up what they could in dental offices. The preceptor had usually obtained his information in the same way. In those early days clinics in state and national societies were clearly of value. Now but few dentists are not dental college graduates. A graduate of a dental school with the present methods of teaching and equipment ought to know how to perform all kinds of dental operations. A dental school whose teaching faculty is not up to this standard ought to be closed, since this is the inducement held out to the student when he matriculates.

Accompanying the narrow education of the dentist is the entire loss of respect and honor to those who have done original research. Deans of dental schools, editors of dental journals, to say nothing of the better class of dentists, entirely ignore the work of others. They use the work of others without credit, as if it were common property. This method is so common that rarely is original research work in dental literature quoted or credit given to those who have originated new thought. This demonstrates the unfamiliarity of dentists with the ethics of scientific investigation. Take up any dental journal, read any article and discussion, outside of mechanics, and the limited education of the author, as a rule, is apparent. The argument is often narrowed to an effort to explain etiology by a single case, when in the near future another case may be presented with a directly opposite history. There is an inability to grasp general principles.

A short time ago advancement in the teaching of dentistry was proposed by extending the course from three to four years. Fortunately, this proposition was reconsidered, for even five or six years of the present methods would not improve the graduate, who had received little or no preliminary training. Emerson says, "No man can learn that which he has no preparation for learning."

There are a few workers in the dental field whose horizons

are not limited to the mechanics of the specialty, who know there is another side to be considered; that the present methods of education and practice are only partially successful; that a broad enough view has not been taken. The teeth are not a law unto themselves. They are a part of the entire body. Diseases that affect one part of the body must affect the teeth. The food that nourishes the body must nourish the teeth. Embryogeny, developmental pathology and the central nervous system enter into the structural development. These subjects are but slightly considered.

I can best illustrate what I have to say of future dental education by reciting the history of the development of the Pullman sleeping car. When the first sleeping car was put on the Alton road between Chicago and Alton the manufacturers of it had no idea of its future possibilities. They considered it similar to any other car, consequently did not make provision for the extra strength needed in the wheels. Older men will remember that upon the arrival of trains at stations it was necessary for a corps of men to hammer the wheels to see if they were cracked, and, if they were, that car was side-tracked and another substituted. The popularity of the sleeping car soon demonstrated the necessity for better wheels, so that a sleeping car could be run from Boston to San Francisco without the expense of testing wheels at every station. The best mechanics in the country were employed, who invented the Allen paper car wheel. This wheel, the height of perfection at that time, would stand the strain without many defects, but each wheel cost $86.50, a very expensive improvement. It remained for a graduate of the Boston School of Technology to conceive the idea of mixing metals so that a wheel could be cast superior to the Allen paper car wheel. This wheel was put under the car at the small expense of $6.50. Most of the wheels now in use under the Pullman cars are manufactured by this process, at a saving of $80 on each wheel.

As time advances it is evident, more and more, that our present methods of practice are faulty. A radical change is necessary. These changes are not along the lines of mechanics, but better education. Carlton says, "We are coming to the point where we must know the science of things, rather than that

which is merely on the surface." Progress says to us, "Cast in your lot with me and prosper, resist me and be crushed."

The return from a four years' course to a course of three years with a preliminary high school education is an advance in the right direction. This requirement is not sufficient. Men should be educated not for the present, but for the future, in order that they may hold positions with men who are to be active in the profession twenty-five to fifty years hence. The grand total enrollment of pupils for all the schools of the United States, public, private, special, higher and lower, is 18,187,918. The enrollment in the common schools is 20.04 per cent of the entire population, as compared with 17.82 per cent in 1870.

In the statistics for professional schools there are some interesting figures. In the 153 theologic schools of the country, according to the last report, there were 7,372 students. Of these 2,094 had received the degree of A.B. or B.S., that is, they were college graduates. In the 99 law schools there were 14,057 students, of whom 2,429 had received degrees or were college graduates. In the 146 medical schools there were 27,062 students, of whom 2,081 were college graduates, and in the 54 dental schools there were 8,298 students, of whom only 203 had taken college degrees. The proportion of college graduates in the theological schools is nearly twice that in the law, nearly four times that in the medical, and the dental students are, comparatively speaking, "not in it." In any walk of life, graduates of universities and colleges are found working side by side with the men of ordinary education. The professions are fast filling with college bred men. Dentistry for more than thirty years has been seeking its position among the professions. It may divide into a trade, the mechanics of dentistry and stomatology, the science of diseases of the mouth. Educated men in all departments of life have the advantage over the uneducated.

There will be in the near future a profession differing entirely from that of to-day. By the present methods of filling teeth teeth are not saved. We wait until a cavity has formed, then fill it. If the tooth decays about the filling we fill it again or crown it. We continue in this manner as long as the tooth remains in the mouth, or until the patient dies. We do not save the teeth as a nation or a family. Decay of the teeth is a natural process

of evolution and disease. If they must be filled for the present, we should have some non-perishable material that can be pressed into place in a few minutes. Something that will save the tooth and not disintegrate. The present method of packing gold, piece by piece, keeping the patient and operator on a continual strain, is pernicious and unscientific. How many articles have been written upon sensitive dentine, and yet what little progress has been made on one of the simplest problems of etiology we have to contend with. The correction of irregularities of the teeth will not be based "on occlusion," but upon etiology, like other diseases. The successful practitioner of interstitial gingivitis must be well educated in every department of medicine. Indeed, he must be far in advance of the average physician. He must know the laws governing diseases of the body.

The gums and alveolar process are more sensitive than other parts of the body, and therefore indicate systemic derangement more quickly than other structures. The scientific eye and nose will often detect systemic disturbances long before they manifest themselves to the general practitioner. That many diseases of the body are due to the accumulation of different germs in the mouth is dawning upon the profession. This was brought forcibly to the notice of the profession by A. H. Levings in his work on "Surgical Bacteriology of the Mouth" (*Journal of the American Medical Association,* 1905), read before the Section on Stomatology of the American Medical Association at Portland. The dentist should be able to observe the changes in the mouth conducive to germ formation and either prevent their development or change the conditions to prevent systemic disease.

Dr. Harvey Cushing of Baltimore first showed (Johns Hopkins Hospital Reports, V, IX) the importance of sterilizing the mouth in operations on the stomach and intestines. The dentist should be able to recognize structural changes, not only pathologic, but developmental, and trace their etiology to the embryonic states. The development of the central nervous system and in turn its relation to normal and abnormal development of other structures of the body will then be understood. The dentist should understand the changes taking place in the internal organs associated with indigestion, such as intestinal irritation, fermentation and putrefaction, hepatic insufficiency, and faulty metabolism. All

departments of medicine are fast realizing the etiologic importance of auto-intoxication. No specialty in medicine is so easily and quickly involved by auto-intoxication as stomatology. Indeed, the first symptoms of auto-intoxication are observed in the mouth. They readily indicate that grave difficulties are only a little farther ahead in store for the patient. The dentist, then, should be able to forewarn both the patient and family physician. These subjects should come into the province of the practitioner of dentistry. Is there a scarcity of material for dental journals? Has the profession written itself out? Is there nothing new to write about? That will depend whether or not the dentist is mechanical or scientific.

People are eager to acquire knowledge in every walk of life. Why should the education of the dentist be dwarfed? There seems to be a concerted effort on the part of certain teachers to magnify manipulative skill and decry an academic or medical education. One teacher says, "It is my experience that the higher the preliminary education is the less satisfactory will be the dentist." Another, "The higher you go in preliminary training the less will be the ability at the end of the fingers to accomplish practical work." Still another, "I never have seen a graduate of medicine make a good dentist." Another, "The best educated men make the poorest dentists." These men always demonstrate their experiences with one or two cases, and afterward in an offhand manner state that they are not in oppositon to better preliminary education.

This method of reasoning tends to poison the minds of teachers until they come to believe that an education is not a necessary accomplishment. I believe the manipulative skill theory is overestimated. When we are better educated, and understand that decay about gold fillings in many cases is due to systemic causes rather than poor operations, their theory will soon vanish. To advance such a doctrine is narrow minded, since our best master mechanics are college graduates. Indeed, there is no better proof of the opposite than that presented in the mechanic arts when college bred men are taking the places of the uneducated. Educated men in certain departments of work are already advancing their specialty to such an extent that other similar institutions cannot compete without employing equally educated men.

When Mr. Cleveland was a candidate for the presidency on the free trade platform, some years ago, a United States senator asked Mr. Carnegie what effect free trade would have upon his steel rail factories. He replied, "No effect whatever." Mr. Carnegie had anticipated such a change in the administration and had employed a scientific engineer to go through his factories and change the methods of rail making from the old hand method to that of machine. The result was that after the mills were put in working order ten men and boys could do, without becoming overheated and fatigued, the work of one hundred men, thus reducing the cost of manufacture to a minimum. Other manufacturers, in order to compete, have been required to employ educated as well as skilled workmen.

According to certain authorities, stomatologists believe mechanical and operative dentistry to be a "Minor qualification, while the medical school and all therein implied is the foundation of dentistry, nothing more being needed." This opinion, and the one that educated men cannot make good operators, do not merit discussion. Uttered by leading teachers, they tend to dwarf the minds of teachers and pupils and set low ideals for dental schools. The stomatologist, being a broad and not a narrow man, believes that the mechanics of dentistry reached its highest development years ago; that the student is getting all of that branch necessary; that for the specialty to progress the student must have broader studies without losing anything now taught in dental schools.

The young man entering a dental college without a preliminary education is handicapped. Not understanding the studies of the first year, that year is wasted. Beginning with little or no education, the education received for a professional career is merely that obtained in a dental college. He has never been taught how to study. Four, five or six years might make him slightly more proficient in manipulative skill, but they would not develop the science and culture essential to compete with the man of the future. From the standpoint of a man of culture, he has had little or no training. The mechanical dentist in the past was not expected to have culture. The stomatologist of the future must be cultured to succeed. From a social standpoint he must stand abreast with the members of other specialties. Even to-day

educated dentists are the most successful prosperous practitioners.

In years gone by men have made marks in the world without college education. If college education were as popular then as it is to-day, many more men through it would have made reputations. In these days of colleges and college advantages those best prepared mentally are the ones who succeed. It is a common law in evolution that a man with the quickest intellect and greatest power of endurance distances the weak or the stupid.

The methods of teaching pathology must be entirely changed. There is just as much difference between pathology as taught to-day, and as it should be taught, as there is between old methods of making car wheels and new. The methods of teaching pathology to-day are an abomination and a snare. They are hard to understand and explain; indeed, teachers do not explain etiology, which underlies most pathology. A new method should be taught. It should be distinct, easy of comprehension and account for the pathologic phenomena related to the head, face, jaws, teeth and structural changes of the body.

Before 1841, according to Hayden, mechanical and operative dentistry "was not in strictness the indispensable requisite qualification of a dental surgeon." The dentist to be qualified in his profession must be thoroughly educated in the science of medicine. What was true in early days of crude dentistry is still more true in days of advanced education. The medical profession is fast adopting the methods of dental teaching by making its students proficient in methods of practice before they graduate. The dental college, perfected in this branch of industry, must now turn its attention to the science of medicine.

Assuming that the young man who wishes to practice stomatology is as competent as he who wishes to devote his time to any other specialty of medicine, how should he be educated? Obviously, in a general way, in the same manner. Few boys decide upon their avocation in life before they are sixteen. Those who expect to take up professional life should be required to graduate from the high school. There are high schools and high schools. These differ throughout the United States, both as to length of course and character of teaching. The National Board should stipulate the length of the course and the character of the teaching. To begin the study of dental science comprehendingly

and effectively the student must have a well-trained mind. His studies in the high school must first of all consist of the usual branches in English, Latin, science, history and mathematics. Manual training at this early age will assist greatly, not only the manipulative skill in the dental clinics, but will facilitate the handling of instruments, appliances and drugs, in other departments of science. The principles of physics, chemistry and general biology must be thoroughly understood ere graduation from the high schools. The younger the student is when he begins those subjects the more quickly he grasps the principles. Entering the university, the student should devote two years to advanced physics, chemistry and biology. He should continue English, Latin, Greek or German, or all four. He should obtain a good knowledge of evolution in general, and of man in particular, and to do this he must understand embryology, particularly that of the nervous system. Bacteriology should be included if time permits. Pathology of the head, face, jaws and teeth is based upon these foundation principles. No teacher can teach pathology correctly and easily without them.

A man thus equipped, knowing how to study, is able to grasp any subject that may be presented in a dental college. Is it necessary then to subject such a man to a four years' course in a specialty in mechanics? Give him now all the mechanics, both laboratory and operative, that the college may require, but do it methodically and do not waste time teaching him.

Next to the preliminary qualification for the successful study of stomatology, the dental college faculty is to be considered. How can young men with the preliminary training required by stomatologists, be received and educated by the average dental faculty? Are the present faculties capable of teaching such students? I have no ill feeling for the faculty of any dental college, but of necessity, great respect for men who labor for the good of humanity by giving the best that they possess, without compensation, for the education of the coming generation. Being a teacher myself, I feel that I can justly place this subject before the profession in an unbiased and friendly spirit. I have already called attention to the narrowness of dental graduates, a narrowness due in part to the college teaching and environment. The teachers were educated in the same schools. This has tended to narrow

their views and teaching. Graduates of medicine and educated men complain of narrow, unscientific teaching in dental schools. Some have left college and others have concluded not to practice because of this narrowness. The teaching of the relation of general diseases to the mouth, jaws and teeth, and vice versa, is yet in its infancy. Unless dental teachers be more broadly educated, progress cannot be expected. The chaotic professional condition existing for the past three decades will continue, and humanity will not be properly served until dental colleges graduate better educated and broader-minded men and women.

How shall this great change in dental colleges be brought about? Let two or three universities in the North and one in the South having dental departments demand a degree for admission, just as some medical departments require. The dental profession is eager for the change and will use its influence to send students to such schools. The first schools that require such qualification will educate men who will eventually fill the chairs of other colleges. There is now a demand for such men. All are looking forward to the time when Harvard will take the lead. When this era has been established our specialty will take a position in the front ranks of medicine.

Fifty years ago, standing on Boston wharf, I saw a two-masted schooner, seventy feet long, fastened alongside. The captain had been waiting two days for sufficient wind to take him out to sea. While standing there a little breeze came up from the northeast. The captain jumped abroad, took his station at the wheel. A man and a boy were ordered to take long poles and push the vessel away from the wharf. As the vessel moved away the captain gave orders to raise the sails. Orders were then given to the man and boy to paddle the vessel away from the dock. As the captain stood at the wheel, giving orders, shouting at the top of his voice, he seemed to me a wonderful man with a large amount of intelligence, to master and control such a vessel. A short time ago I went to the dock in New York City to take a steamer for Europe. The vessel was advertised to sail at ten in the morning. Before the hour, the captain, dressed in uniform, stood upon the bridge. Precisely on the minute the throbbing of the engines was felt and the great vessel, 700 feet long, carrying a crew of over 300 men, quietly left her moorings and steamed

away down the bay. What a contrast between the two vessels! Here was the captain standing quietly on the bridge, not a word had he spoken, and yet by pushing buttons here and there, all the machinery of this great floating palace and all the crew were under perfect control. What a vast amount of knowledge was required to master the steam, the electricity, the new methods of navigation and so many men! What a change in fifty years! I said to myself, "This captain is a finely educated man, but would the captain of the schooner be able to control a modern steamship?"

DIAGNOSIS, CLASSIFICATION AND SURGICAL TREATMENT OF CASES OF IMPACTED LOWER THIRD MOLAR TEETH.

BY F. K. REAM, D.D.S., CHICAGO. READ BEFORE THE SOUTHWESTERN MICHIGAN DENTAL SOCIETY, AT NILES, MICH., APRIL 10, 1906.

It is with some diffidence and perturbation of mind that I venture to offer suggestions to the country practitioner relative to the extraction of teeth, because we find him expert and dexterous in the art. But, inasmuch as I am of country birth and experience and one of you, let us jointly consider some anomalous conditions which we are called upon to treat.

Dr. C. N. Pierce, page 646, Vol. III, American System of Dentistry, says: "An impacted lower third molar at the base of the coronoid process is capable of giving as much excruciating and persistent suffering as is possible for human nature to endure. There is no abnormality or lesion coming in the province of the oral surgeon which demands more prompt action, or, for the time, more thoroughly taxes to the uttermost his best judgment and skill. The removal of the anterior molar is often indicated for the purpose of giving relief."

This estimate of the severity of such a condition is not overdrawn, but the ruthless sacrifice of the second molar tooth, rendering useless its upper antagonist, is no longer practiced by the modern operators. I feel very confident of this position, be-

cause I have never yet found a case of such severity that I deemed such a sacrifice necessary. Now that we are assisted by the X-ray, and by local and general anesthetics, the dreaded operation necessary, is robbed of its terrors.

It is for the study of this class of cases, their diagnosis and surgical treatment, that I beg your indulgence this evening.

No patient falling under the care of the general practitioner is less welcome than the one with the impacted lower third molar, and it is common for such, after having been sent from pillar to post, suffering untold agony, to appear with badly swollen, ankylosed and fistulated jaws.

Oftentimes, with complete closure of the mouth from infiltration of muscular tissue due to septic conditions, these patients appear most pitiable indeed. It is common for the specialists to receive patients, who have suffered for years with these conditions, who have had palliative treatment only at the hands of the dentist or physician. Oftentimes, after unsuccessful attempts to extract these teeth have been made, devitalization has been resorted to, followed by the grinding away of portions of the crown, but the patient, though assured of relief, is doomed to disappointment.

Some of the most distressing cases I have seen have been treated in this manner. One patient stated that he had paid $300 to dentists and physicians for relief during a period of three years and the teeth were still in his mouth.

The rational consideration of this subject, in my opinion, should be under three heads, viz., prophylactic, palliative and surgical.

The first indicates the early extraction of these teeth. The suffering in most cases could be very much lessened if the dentist would advise the patient to have the teeth removed, caution him of the great danger attending their retention and of the likelihood of caries of the second molar, a most valuable member, and impress upon him that the operation is least painful when the parts are in a healthy condition, and the teeth free from caries.

Palliative treatment is indicated in cases presenting inflamed conditions, brought about by the constant irritating movement of the lower jaw. Such conditions are due largely to pressure from the upper third molar, in which case the offending tooth should be removed and the patient instructed to use an efficient mouth

wash, and in addition to this paint the parts daily with the following iodine combination:

Zinc iodide.....drachms iii
Distilled water.....ounce i
Tincture of iodin.....drachm v
Glycerin to make.....ounces iv (Prinz)

After the swelling and pain have subsided the impacted tooth should be removed.

Much care and judgment should be exercised in the selection of a time when the conditions of the parts will allow of an operation, so that alveolar abscess will not result, for the conditions here are not at all analogous with the conditions in other parts of the mouth. Active inflammation and swelling should be reduced by the above iodin treatment, by the employment of saline cathartics and the use of the ice bag. Any effort at extensive operating is likely to extend the abscess and spread the inflammation throughout the cellular tissue in that locality, because of the pressure necessarily produced in opening the mouth of the patient whose masseter muscle is in a state of trismus.

Surgical interference consists in the removal of the teeth, and the modus operandi is as follows: If the case is of sufficient gravity a radiograph should be obtained, enabling the operator to determine the exact position of the tooth, and whether it be multiple or single rooted. This having been determined, the parts should be injected with a local anesthetic, after which the process surrounding the tooth should be freely removed with the dental engine and medium-sized rose-head and fissure burs. The parts should be flooded with an antiseptic wash during the operation, and a thin concave ⅞-inch carborundrum disc should be used in cutting away crown resting against second molar tooth. This can be done with but little pain and will be tolerated by the most nervous and sensitive patient. Frequent tests should be made of the tooth with elevators to detect any slight movement and indication of its support having given away. When a thorough preparation has been made the tooth will be completely undermined. Then administer gas and extract with properly formed elevators.

Thus have been outlined operative procedures simple, rational and effective—procedures that may be adopted and practiced to your entire satisfaction.

As a guide in the selection of instruments to be used in the various cases, I suggest a classification of the cases into first, second and third degrees. (Fig. 1, a, b, c.)

a. In cases of the first degree the third molars are in normal position. Physic forceps should be used to loosen and tip tooth distally so that it may be lifted out with plain short-beaked lower molar forceps. It is always good practice to use the physic forceps

Fig. 1

on lower third molars (excepting in third degree cases), as the unsuspected tooth may prove to be crooked at the root and cause trouble.

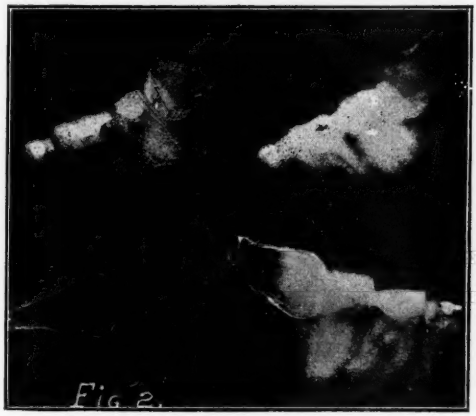
b. Second degree teeth are those slightly tipped in their relation to the second molar. The same method should be followed in this case as in first degree cases.

c. Cases of the third degree are of the severe type and must be treated in a surgical way, as described elsewhere in this paper.

I offer this classification and suggestion for operating, also a plea for the use of the physic forceps. At the same time I warn against their use indiscriminately and urge a careful selection of

cases for their employment. Injury to and fracture of the jaw, in third degree cases, may be produced by the unskilled, but on the other hand, if the forceps are properly and skillfully applied, they are harmless and humane instruments. I am astonished at the great number of men who regard the instrument with fear, when by its proper use the fracture of nearly all lower third molars, having curved or crooked roots, could be avoided.

A valuable aid to the support and protection of the second molar tooth in cases in which the first molar has been extracted is shown in Fig. 1. This was devised by Dr. Nevius. Without some means of support the second molar is likely to be permanently injured or even extracted during a severe operation, as indicated in this diagram. The small wooden block fitted between



the bicuspid and second molar gives perfect support and protection, and the operator may feel perfectly safe in using the amount of force necessary to remove the third molar.

I will now show a number of interesting slides and describe them as I go along.

Fig. 2.

Here are shown in this slide radiographs of four impacted lower third molars. They are characteristic and typical, and you

will observe the different degrees of impaction. In this skiagraph the teeth lie on a line with the second molar, making it possible to completely excise the crown with engine and stone.

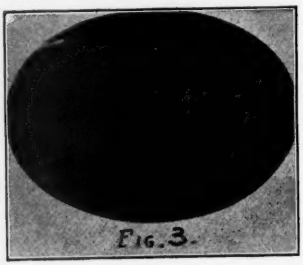


Fig. 3.

This picture shows the third molar lying much lower, well beneath the crown of the second molar, and is a case of a more serious type. Observe how the crown of second molar overhangs the crown of third molar. Much difficulty accompanied this operation owing to the necessity of removing a large amount of process.

Fig. 4.

This case shows impacted third molars, upper supernumerary molar, the cause of great neuralgic disturbance. The patient, a prominent St. Louis physician, suffered for years. Entire relief followed removal of the teeth involved.

Fig. 5.

Elevators and physic forceps extensively used. Among the best instruments on the market for these operations.

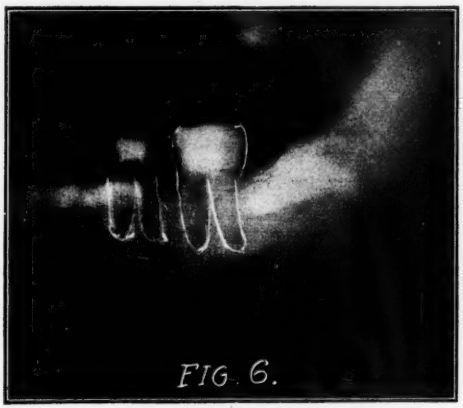
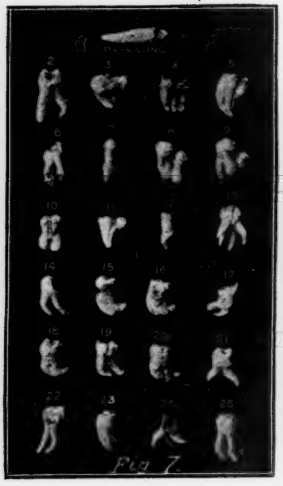


Fig. 6.

No better case demonstrating the diagnostic value of the X-ray could be found than is shown in this picture. The patient was sent to me for removal of broken impacted lower third molar, after a futile effort at extraction had been made by his dentist. Not being satisfied with the first radiograph, a second and third were made, both corresponding with the first, all showing absence of tooth. I still doubted the shadowgraph, and made an incision in the soft parts and packed the wound to stop hemorrhage. Then I determined beyond doubt that the dentist had been misled. The wound was closed by suture.



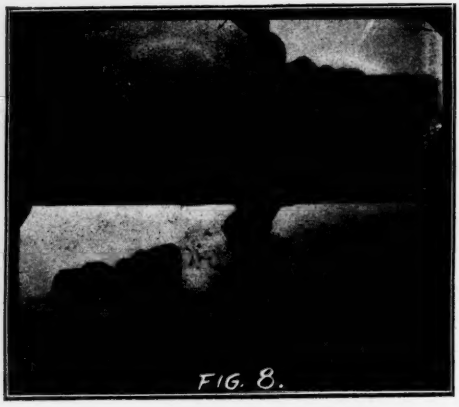


Fig. 7.

This shows twenty-four rare and anomalous teeth, curiosities indeed.

Fig. 8.

Here is shown congenital absence of first molar in mouth of mother and daughter.

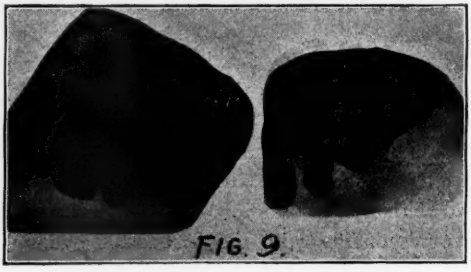
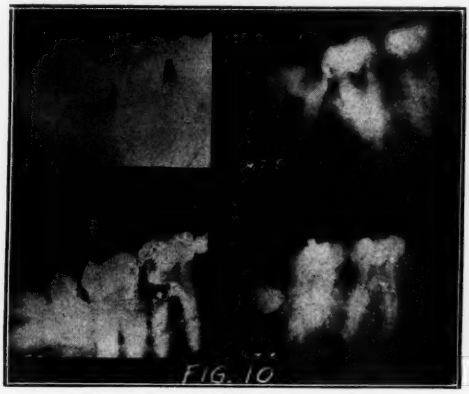


Fig. 9.

Another indication of the diagnostic value of X-ray is shown in this picture. Any operator would mistake the temporary teeth

shown here for the coming cuspid, while the cuspid is lodged high up in the arch. With the picture the true condition is made perfectly plain.



Figs 10 and 11.

The three pictures now shown on the screen are interesting impacted teeth. Radiographs taken by Dr. M. I. Schamberg,

Philadelphia, Pa. The doctor is master of the radiographic work and obtains by far the best results of any operator of the X-ray in the United States.

LIGHT.

BY WALTER N. SHARF, M.D., INDIANAPOLIS, IND. READ BEFORE THE EASTERN INDIANA DENTAL SOCIETY.

I have chosen this subject for my paper before your society because light is the most essential feature, or equipment, I may say, of a dentist's office.

When a dentist seeks an office location, light of the proper nature should be the first consideration. He can do without polished walls and floors, or even electricity and compressed air, but good light is indispensable.

Having been a practitioner of medicine for twenty years, and of late years having specialized distinctively in the practice of diseases of the optical part of the human economy, and the requirements for normal refraction, the subject of light is naturally an interesting adjunct to my work, and I shall endeavor to present to you some of the requirements of your profession in relation to it.

Why we need good and proper light is obvious to you men of the dental profession. First, for the benefit of your patient, you wish to see well what you are doing, and second, you choose to protect your own eyes from unnecessary accommodation and injury.

To illustrate the effect of light rays upon the retina, suppose we take a camera of good make with a perfect anastigmatic and anacromatic lens and attempt to take a picture. Pointed *toward* the direction of the sun's rays, the image of the object is ill defined on the ground glass and halos are produced, but focused upon the object *from* the sun's rays, if the object is free from reflection, with proper diaphragm, the image is sharply cut and well defined, and the detail perfect. Unlike the camera, the eye is constantly focusing upon various objects, constantly dissolving when we change our view from one thing to another, now in good and well directed rays of light, then in poor or strong light, shunned to a degree by squinting and frowning, cutting off the larger field of exciting rays. If you have walked our streets in Indianapolis on a bright, sunny day and have tried to attain your equilibrium while looking at the bright sidewalks or stone buildings as they reflect the sun's rays, you will have some conception of what I am attempting to describe.

The eye, unlike the camera, which is focused by rack and pinion, cuts sharply *its* image by the action of the ciliary muscle. It is necessary to bring this muscle into play when viewing all things within the walls of an ordinary operating room, within distances of twenty feet, and the nearer the eye to the thing looked at the stronger the contraction of that muscle must be. This is according to the physiological law of accommodation, but when an error of refraction exists (and dentists are not all exempt from such) a *much greater* contraction of this muscle is necessary in order to overcome the error. Thus is good light indispensable, not only for maintaining the normal visual function, but for preventing the contraction of visual errors, which often follow cramped ciliary action due to poor light.

The same kind of light may not be the proper thing for every dentist, any more than the same kind or curve of forcep. We have learned to judge distances in various lights just as we have learned to exert muscular force or measurement in mechanical work, and these things are not exactly the same with all individuals. The north light is said to be the best light for the majority of workmen, because it is void of the sun's direct rays, and is softer, as artists term it, and the color values are better comprehended; but whether it is better than a south or west light, properly screened, is a question. Cross lights are decidedly harmful in causing shadows and deception of distances.

I know a dentist who is considered as able an operator as there is in the city, who has two large north windows without curtains or screens, and apparently he works with comfort. Another dentist, equally as good in judgment, has a large south window, properly screened. The man with the north windows has light thrown in partly by reflection from a large stone building opposite and partly from the blue sky. This light is not of constant quantity. The room is flooded with soft, diffused light which might be improved by properly curtained windows. There is no doubt that a single north window gives the most general satisfaction for all purposes, for the obvious reason that the window is free from the direct sun's rays, and the light is necessarily more constant in quality; but such a window should be so shaded by upper and lower curtains as to focus the light, so to speak, upon your work. The shades cut off all rays which might other-

wise reflect from the wall, glassed pictures or other reflecting objects in the room. A bay-window is to be deplored unless it is furnished with one frame only, and that properly curtained, for with the dentist the oral cavity is to be illuminated, and the shadows cast by the cheeks, lips, tongue and teeth, by the instruments, and sometimes by the hand and head of the operator, should be avoided as far as possible. To overcome these shadows avoid a room with many windows, or with windows opposite each other, causing cross light. It is not the quantity so much as the even quality of light, properly directed, that you are seeking. The chair should be so situated that the light can be thrown into a cavity without being obstructed by the operator's hand, for greater ciliary strain is required to overcome this.

Your laboratory work bench should be so arranged that the rays of light will be thrown from your left, if you are right-handed. This window can also be curtained and the light modified to suit your particular work. Do not have your window directly in front of your table, so that you will be obliged to face the light, as such an arrangement would ultimately ruin your vision. The walls of the rooms should be so tinted as to produce soft effects and be restful to the eyes. The blue and green shades probably approach nearer to the design of the great architect and Creator, for He who tinted the sky and fields knows best what is most suited to the retina of man, and it is for us to accept these hints as we see them thrown out to us in nature.

Some dentists do much work by artificial light. I do not know much about operating lamps, but on general principles the bulb must be small and be shaded from the eyes of the operator. It stands to reason, too, that when such lights are used principal light from other sources should be shut off. Some offices are so situated, more particularly in crowded cities, that artificial light is principally depended upon. The chief value of any artificial light is its constant quantity, that is, its freedom from flickering and absence of extreme brilliancy. The retina contains an element known as the visual purple, which has the function of absorbing light. You have probably looked at the sun, and for minutes afterward have seen its shape in dark outline. I once sat in a room when a flashlight picture of the room was taken. I fixed my vision upon a certain picture, and the flash was so

intensely brilliant that I could see the outline of the picture for several minutes afterward. This was due to an exhaustion of the visual purple in my central field of vision. Bookkeepers, draughtsmen, stenographers and others who have to depend entirely upon artificial light, and who constantly look upon white paper which reflects the light, often complain of their eyes, and if such conditions prevail for years, the outcome is ultimately disastrous to the retinal elements.

The incandescent bulb light is probably the best to use for general purposes. A frosted bulb breaks the direct rays from the filament within and makes the light more soft and more diffused. For reading purposes a Welsbach gas light is very desirable, but the more intense any single light is the deeper are the shadows. This is particularly noticeable with the arc light. The shadows of leaves or other objects are very deep and sharply cut. The *very bright* light would seem to be the best for reading, but one too intense soon tires the eyes. This can be overcome to a certain extent by the light of an additional lamp—a bulb light overhead, for instance, or a proper shade adjusted to the Welsbach. By this addition the light is softened throughout the room and the shadows less dense. With these few hints, gained only by thought and experience, I trust some good may come through them to yourself and patients.

DENTAL STYPTIC.—To check hemorrhage from a root socket, roll pledgets of bibulous paper as solid as possible, slightly smaller than the opening of the socket. Soak one of these in pure creosote, squeeze out excess and pack it into the socket as far as possible. Pack the socket in this manner until it will contain no more. If the hemorrhage has been extreme, apply a compress on top of the balls, but in most cases this will not be needed.—J. E., in *Brief*.

Of the cavities presenting themselves in the six anterior teeth, those known as labial cavities demand the use of porcelain more than any other. Next in importance comes the simple approximal cavity, and although we see the need, from an esthetic point of view, for filling the approximal cavities, which involve the incisal, with this material, we are obliged to take into consideration the amount of stress to be brought to bear, and the direction in which it will be applied before we can safely decide what material may be used in restoration.—CRAIG M. WORK, *Tri-State Dental Record*.

Digests.

A COMPARISON OF BEGINNING AND BURROWING CARIES. By Frederick B. Noyes, D.D.S., Chicago, Ill. The subject of my paper has been announced as "The Inception, Progress and Treatment of Caries. This is much too large a field to attempt to cover in a single evening, and I am therefore going to confine myself to a comparatively small portion of the subject, and attempt to make a comparison between the conditions presented and the treatment required by beginning as compared with burrowing decays.

I have been led to this partly by the criticisms of the doctrine of Extension for Prevention, originating largely in the East, namely, that it leads to an extravagant and unsightly display of gold. I hope to show that the extensive show of gold is the result of extension for strength, and extension for convenience, not extention for prevention.

The discussion of extension for prevention has led to a much closer study of the appearances and positions of beginning caries, and the directions of its superficial extension, and an evening might be spent on this topic.

In fact, extension for prevention in practice might be defined as a study of the positions and conditions of the superficial extensions of caries and excavation with reference to them. To successfully apply this rational treatment of caries has required modification of the detail of cavity formation, with reference to strength, retention, and access, a study of the means and manner of rapidly and perfectly condensing gold, and perfect and easy finishing of the filling in proper contour. One of the reasons that there has been so much opposition excited by the discussion of this subject is that all of these things have not been taken together, and bad results have followed the attempt to apply the principles without the necessary technical knowledge and skill to properly execute the work. In discussing the treatment of caries, therefore, it is not enough to decide upon the extent of excavation required, but the manner of execution of the filling must be described, so that the filling may be well enough adapted to the walls and sufficiently dense to exclude moisture, and be inserted and finished in a reasonable amount of time.

In studying the picture, therefore, we will attempt to examine in detail the conditions of attack and extent of disintegration of tooth tissue shown in the case, the cavity preparation called for, and the manner of inserting the filling.

Caries of the teeth always begins in sheltered positions and these are devisible into two classes, each presenting characteristics of appearance and manner of progress which are important to be clearly understood and must be constantly borne in mind. These are caries in natural defects of the enamel, and caries on smooth surfaces.

Caries appears first in the depths of natural defects in the enamel, caused by imperfect closure of grooves, developmental lines and pits. In these positions the mouth of the groove or pit becomes choked with food debris or the products of microbic growth and the acids produced are confined in the depths of the natural defects.

The action on the tissue is therefore greatest in the deepest part of the defect and becomes less as the surface is approached from which the acids are rapidly removed by the saliva, and the surface kept clean and polished by friction. In these positions the disintegration of the enamel extends laterally, and toward the dentin, until the dento-enamel junction is reached, then the process spreads rapidly in the dentin, undermining the enamel. In all stages of progress it presents a wider lateral extent in the deep portion of the enamel and dentin than upon the surface.

Decays beginning in natural defects are therefore burrowing decays almost from the start, and especially after the dento-enamel junction is reached, the lateral extension is rapid and may be of any extent without showing on the surface.

In general terms, beginning decays may be classified as those in which the lateral extension in dentin is not yet greater than the superficial attack or extension in the enamel.

Burrowing decays are those in which otherwise sound enamel is undermined.

Upon the smooth surfaces of the enamel caries attacks the tissue at points which, for some reason or other, are sheltered from the natural friction of food in mastication.

The intensity of the attack will therefore depend upon several factors, some of which may be stated as the thickness of the colony, the nature of the zooglia formed, or, in other words, the toughness

of the plaque, the rapidity of growth, which is one factor in the extent of surface attack from the point of greatest intensity; and the conditions which produce the shelter from friction, which are the most important factors in determining the extent of the areas of liability. In the attack upon smooth surfaces, Dr. Black pointed out very clearly, in a paper not long ago, that the conditions present two distinct tendencies: first, a tendency to penetrate the tissue, dissolving the cementing substance from between the enamel rods, and, later, the substance of the rods, until the tissue is penetrated and the dento-enamel junction is reached; second, a tendency to spread on the surface from a point of greatest intensity to areas of less and less intensity.

When the point of the penetrating cone reaches the dentin, that point still remains the point of greatest protection and, consequently, the point of greatest acid formation. This acid passes through the now porous enamel, acts upon the dentin and affects the contents of the dentinal tubules, causing the streaking of the dentin toward the pulp chamber, often exciting reactions in the pulp tissue, and dissolving out the inorganic salts from the matrix. The destruction of the dentin follows the direction of the dentinal tubules and therefore spreads laterally, most rapidly at the dento-enamel junction, where the branching of the tubules is greatest. The form of progress in dentin is always conical with the base of the cone at the dento-enamel junction, except where the form of progress is modified by imperfect structure of the dentin.

The spread of caries in the dentin causes an undermining of the enamel, and the production of a cavity which furnishes an opportunity for the growth of micro-organisms and the retention of their products, so that the enamel is attacked rapidly from the inside, producing the secondary decay of the enamel plate from within outward, which undermines the tissue much faster than the attack spreading upon the surface. If at that time the cavity is filled and the burrowing is stopped, the surface attack will again appear in the remaining area of liability. We very often find that the burrowing has extended in some directions, undermining and disintegrating the enamel much farther than the surface attack would be likely to spread. In preparing such a cavity the undermined enamel would have to be cut back to a greater extent than would

be required for prevention. Such extension is extension for strength and not extension for prevention.

A few days ago a cavity in the mesial and occlusal surfaces of a second upper bicuspid was presented. Upon breaking the undermined enamel it was found that the decay had burrowed to the buccal and gingival, undermining the buccal plate so that nearly one-third of the buccal surface had to be cut away. This was not extension for prevention, for it left the cavity margin well around the angle on the buccal surface. On the lingual there had been little burrowing, and after the enamel had been cut back to sound dentin a well-defined white streak could be seen extending from the linguo-gingival angle, showing that the surface attack was extending in that direction and requiring extension for prevention. The unsightliness of a gold filling in this cavity could not be charged to extension for prevention, but to neglect by the patient. If this cavity could have been treated as a beginning instead of a burrowing decay, buccal margins should have been left just to the mesial of the mesio-buccal angle and in a comparatively inconspicuous position.

Now, before taking up the pictures, I want to make as brief a statement as possible of some of the factors to be considered in determining the degree of extension, first, in beginning, and, second, in burrowing decays. To do this at all exhaustively would be too much of an undertaking for the present purpose, for the first topic involves a close study of all the conditions of caries. I assume, therefore, a familiarity with the conditions of caries and the areas of liability which have been described before and with which dentists should be familiar from their work from day to day, and I will simply mention the factors to be observed and considered. These factors I should class under two heads—first, general or systemic conditions, and, second, local conditions and local manifestations of conditions.

Every careful observer comes to recognize conditions which are still too indefinite and poorly understood to be capable of accurate statement, but by which he is led to the opinion that the patient in question manifests a peculiar liability to caries and that the disease will manifest extreme energy and persistence. In determining the extension required by beginning decays, this is the first factor to be carefully weighed, and it is the most difficult. It is to be hoped

that some day microscopic and chemical examination of the saliva or other secretions may give us more tangible evidence on this point, but at present the determination of the relative systemic liability or immunity of the patient is very difficult and uncertain and remains a matter of instinct rather than judgment, and is based on the "ensemble" of the clinical picture, so to speak, rather than facts which can be stated. The heredity of the patient as expressed by the history of the parents with reference to caries should be considered, and especially any marked change in the conditions and manner of life, either by the patient as compared with the parents, or the present as compared with an earlier condition of the patient.

The local conditions are much more satisfactorily considered, as they admit of clear statement. They are, first, the form and relation of the teeth themselves. For all proximal cavities, the smaller the gingivo-occlusal dimension the greater the extension required. The smaller the difference between gingival and contact diameter, the greater the extension required, though this can be partly compensated for by separation. The broader the contact surfaces, regardless of other conditions, the greater the extension required. Second, is the appearance of the attacked surface. Before excavating a beginning decay a medium fine strip should be drawn several times over the surface and the appearance carefully studied. The whiter the area of attack, the greater its intensity; it is, therefore, safe to judge that it has not reached its full extent of surface attack and extension must be carried beyond the farthest point of attack. If the lines of attack, extending from the point of greatest intensity, are brown or black, the extension may barely include them and be comparatively narrow. With reference to the degree of gingival extension, the age is a most important factor, as the areas of liability move to the gingival as age advances. This must specially be remembered with reference to gingival third cavities.

In the treatment of burrowing decay, the positions of the cavity walls are determined by the strength of the tissue rather than the continuance of surface attack. The general rule is briefly stated—the enamel must be cut back until supported upon sound dentin. But in addition to this very brief but very inclusive rule, there are a few areas of weakness that must be remembered in the preparation of such cavities. When the decay approaches developmental lines these must be cut out; this is of special importance when bur-

rowing decay from proximal contact undermines the labial and lingual enamel plates close to the proximo-occlusal angles.

A long time ago I called attention to the weakness of the enamel wall in cases in which the burrowing of decay from an occlusal defect has destroyed the dentin under a cusp or marginal ridge. The enamel is thick and often appears strong, but the arrangement of the rods is such that a strong wall can be produced only by cutting away the tip of the cusp or ridge. The failure to do this causes the chipping of the enamel, which is so often seen in these positions.—*Dental Review.*

ACUTE ULCEROUS GINGIVITIS. By Thomas L. Gilmer, M.D., D.D.S., Chicago, Ill. Acute ulcerous gingivitis is a disease seen but rarely and has not, so far as I am able to discover, been previously desribed. The onset of the disease is sudden, the earliest symptoms indicated by a slight malaise which is quickly followed by rapid ulceration, at first confined to the gingivae, usually about two or three of the anterior teeth on both jaws simultaneously and in corresponding localities; later it is extended to the gums about a number of the teeth, or groups of teeth, but rarely if ever does it include the entire gum margin. The lingual margins and festoons of the gums do not participate at first in the inflammatory processes, but later the festoons are destroyed and deep pockets are formed in the interproximal spaces. Still later the lingual gingivae participate, but in no case have I seen ulcerous manifestations in this locality. In twenty-four hours after the patient's attention has been called to the condition of his gums, the parts attacked present the appearance of having been gnawed away until most of the gum tissue overlying the alveolar process immediately adjoining the teeth has been destroyed. The part of the gum attacked has soft, thickened, and in some instances everted margins. The eroded parts form pockets which are filled in with a grayash pasty mass, similar to that found in syphilitic ulcers in the mouth. When this mass is removed a granulating surface is exposed which bleeds easily and is very painful to the touch. The mucosa for a short distance from the ulcerative margins is of a dark red hue as a result of the congestion. The gum covering the cervical and interproximal surfaces of the teeth is destroyed sufficiently in some cases to uncover the teeth down to the alveolar border.

The breath of the patient is fetid, the saliva ropy and in excess of the normal. The temperature in the early stages of the disease ranges about 101 degrees. The patient is nervous and anxious, the appetite is poor, sleep is disturbed, the bowels are constipated. Bloody saliva escapes from the mouth during sleep, staining the pillow.

Without treatment the ulceration does not appear to extend beyond the gingival border of the gums, nor deeper than the alveolar process, but when the case is neglected the entire mucosa of the mouth in a degree participates in the disease, that is, to the extent of becoming red and tender. The ulceration seems to be limited to the areas indicated, and after the destruction of the mature tissue has ceased, the granulations only appear to be destroyed, leaving the pasty mass covering.

The submaxillary lymphatics become involved early in the disease. Macroscopically no pus is observed, but the microscope shows pus cells in abundance.

It is not necessarily a disease of the poor, or those of impaired vitality. It is not confined to those who are careless of oral hygiene; neither is it traceable to metallic poisons, syphilis or renal disease.

With treatment, consisting of local applications of antiseptic washes only, the disease yields slowly, extending over a period of two weeks or more.

After having treated a few cases by local antiseptic applications only, and finding the obstinacy of the disease to such treatment, and knowing how sensitive the gums are to mercury, I concluded to try its effect by giving small doses of calomel in combination with the local treatment, with the most happy results. The home treatment consist of taking four tablets of mercurous chloride, 4-20 grain each, morning, noon and night, followed by a saline cathartic on rising. The gums are thoroughly cleansed before breakfast by a swab of cotton dipped in 3 per cent pyrozone. Every two hours during the day the mouth is flushed with a warm saturated solution of boric acid, to which is added one drop of the oil of cassia to two ounces of the solution. The office treatment consists in a thorough cleansing of the parts in the afternoon with 3 per cent pyrozone, followed by the application of compound tincture benzoin. On the third day under this treatment a marked improvement has uniformly been observed, and in a few days more the gums have been fully

restored. In the place of the benzoin, dilute tincture of iodine may be substituted with equally good results.

I have twice attempted through cultures to discover a specific organism to which the disease might be attributed, but without success. When another case presents further search will be made for the cause.—*Dental Review.*

THE ROLE PLAYED BY CERTAIN ACID DERIVATIVES OF LACTOSE IN THE EROSION OF TEETH. By George W. Cook, D. D. S., Chicago, Ill. Lactose is the dissaccharide found in milk. So far as we know, under normal conditions it is found in none of the other fluids of the body. Like the other dissaccharides, when hydrolized it yields two hexoses. Galactose is the product that interests us most in this case. Under ordinary physiological conditions galactose is oxidized in the body to carbon dioxide and water, thus supplying energy to the economy the same as dextrose and other carbohydrates. It is well known, however, that under certain conditions galastose may be the precursor of certain acid derivatives of which galactonic and mucic acid are the most important. These acids can be easily prepared from galactose by the action of nitric acid in vitro—and it is generally believed that similar proceses take place in the body. These processes, if not directly initiated by the enzymes, are at least governed by them. Clinical observation and experimental data both prove that the body metabolism may be so changed by external conditions as to materially affect the amount and kind of the product formed by the enzymes.

Under normal conditions, these changes may be represented as follows:

$C_{12}H_{22}O_{11}+H_2O—C_6H_{12}O_6+C_6H_{12}O_6$.

Lactose—Galactose and dextrose.

$C_6H_{12}O_6+O—C_6H_{12}O_7=CH_2OH\ (CHOH)_4\ COOH$.

Galactose—Galactonic.

By the oxidation of the alcohol end of this chain we get mucic acid: $COOH(CHOH)_4+COOH$.

This acid is isomeric with saccharic acid which is formed in a similar way from cane sugar. I do not wish to infer that mucic acid is formed from lactose only; but the conditions under which it is found in greatest abundance in the body leads me to believe

that it is generally formed from that sugar. However, isomeric acids may be formed from almost any carbohydrate. For example:

From dextrose—Glutonic acid, saccharic acid.

From mannose—Mannonic acid, mannosaccharic acid.

From galactose—Galactose acid, mucic acid.

It is well known that the mouth constantly contains bacteria, many of which will form lactic acid in cultures outside of the mouth—and presumably likewise form it in the mouth from the carbohydrates of the food. However, no definite and conclusive proof of its presence in the mouth has been shown. It is generally believed that lactic acid is the cause of caries, and it is held by many that erosion is also caused by lactic acid. However, there are many cases of erosion that the lactic acid theory is entirely inadequate to explain.

Experimental evidence that erosion in general is due to lactic acid, is not sufficient to warrant general acceptance of such a view, and the view is questioned by Acree and Hinkins. Lactic acid may play a part in erosion, but I do not think it plays the most important part. While working on the problem in the physiological laboratory of the University of Chicago, Mr. McGuigan suggested that mucic acid might be a factor in the causation of erosion. This suggestion seemed to be reasonable in that it corresponded with many of my clinical observations.

It is a fact of daily observation that during gestation and other critical periods of a woman's life the teeth suffer severely. During these critical periods, and especially during gestation, we know that lactose and its derivatives appear in relatively large quantities in the blood and tissues of the body. So much of it may be present that it is often found in the urine. It is also during this time that the saliva presents a thick, viscid, ropy consistency. This mucoid substance contains the precursor of mucic acid. By hydrolytic and oxidative changes this easily gives rise to mucic acid. Under normal conditions there is only a small amount of acid found and it is readily oxidized to carbonic acid and water or neutralized by the bases of the body. Under changed conditions there may be (1) a much larger amount of acid formed or (2) the lessened oxidative powers of the tissues allow an excessive or pathological accumulation of the acid (acidosis). Hypersecretion of the mucous gland of the mouth, independent of the carbohydrate food, may

furnish the precursor of this acid. Mucin, especially, will give rise to mucic acid. The location of the teeth permits them to be bathed continuously by these products in a manner very similar to that used in the experiments cited below.

To obtain experimental data in support of this view, I obtained mucic acid and carried out several experiments, which, although not finished, furnish sufficient proof to say that mucic acid is an important factor in erosion. At least in experiments on teeth in vitro, undoubted erosion can be produced.

Mucic acid is a sparingly soluble dibasic acid which probably exists in the mouth in the form of a salt or an acid salt. The salt would be more soluble. In my experiments, I used a saturated solution and several solutions of partial saturation. In these solutions I suspended teeth with the crown immersed. They were allowed to hang in this solution and each day taken out and brushed with a stiff tooth-brush. After several months, all showed typical erosion, most marked at the junction of the cementum and enamel. This was so definite that my colleagues had no difficulty in detecting it. In every respect it was identical with erosion occurring in the mouth.

Teeth treated in a similar manner with lactic acid also showed disintegration of the tooth substance, but this was in no case similar to erosion and could be distinguished from the true erosion by feeling in the dark.

These experiments prove that a typical erosion can be produced by mucic acid, and that lactic acid does not produce a characteristic erosion.

In order to obtain further evidence in favor of my views, I made several hundred determinations of the electrical conductivity of saliva. I also determined the freezing point of the series. Some of these were from normal cases, others from cases of true erosion. In many of these the reaction to litmus was acid. I could not reach any definite conclusion from my work on conductivity or from change of freezing point, as the normal salivas differed more amongst themselves than they did from some of the cases of erosion. I next polarized the series, but was still unable to reach anything definite. However, I believe in a carefully selected series of cases physical chemistry will aid in the solution of the problem. Under normal conditions the reaction of saliva is neutral or slightly

alkaline. In erosion, my experience leads me to believe it is always acid. It is well known that in increased muscular exercises or nervous activity, and in increased metabolism the body fluids become acid, or at least diminished in alkalinity. Under normal conditions these acids are neutralized by ammonia and the fixed alkalis. Under excessive changes of metabolism and nervous changes, occurring especially in gestation, puberty, etc., the secretions, and especially the saliva, become more acid, and consequently exert a deleterious influence on the teeth. This deduction is drawn from known physiological phenomena and coincides with my experimental findings and clinical observations. While lactic acid may play a part in erosion, its method of formation leads me to assign to it a less important factor. The nature of erosion and its frequent occurrence at times when the acid derivatives of lactose are more abundant in the body, leads me to give mucic acid a more prominent place.—*Dental Review.*

MINERAL STAINS AND UNDERLYING COLORS. By Robert N. LeCron, D.D.S., Cannes, France. The wonderful and rapid advance of porcelain work as a permanent branch of dentistry within the last few years, is due largely to the many methods and ideas given forth to the profession by the different men, working along these lines, and the co-operation of the manufacturers with these men in supplying the much-felt demand for necessary and better materials.

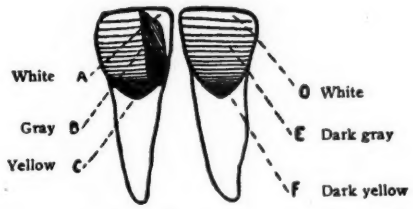
It has not been many years since the few men who first took up this now almost unlimited branch had only the crudest materials with which to carry on their experimental and practical work. However, by the unceasing efforts of such men as Allen, Jenkins and others, we, the more fortunate, have at our disposal a vast variety of materials and appliances with which to further the interest of this fascinating art.

One of the greatest difficulties porcelain workers have had to deal with until lately has been the shade problem. And to those desiring ideal results in inlay work this has proven a source of great disappointment and irritation in many instances. By the use of oil and mineral stains, however, and the adoption of methods whereby certain results are produced by the effects of underlying and overlying colors, this difficulty has been overcome to a

great extent. And I may say, without any hesitation, that with these aids and with such a variety of the necessary tones as are found in several of the porcelain bodies at present on the market, there is in any department of porcelain work as little excuse for an imperfection in the match for color as for an imperfection in fit. With all the methods at hand perfect results can be obtained, as far as perfection is possible in the mouth.

The first essential in selecting shades for an inlay is to study and be able to determine the underlying tones found in the structure of the tooth. For, if one shade be selected that matches perfectly the general appearance of the tooth in which the inlay is to be inserted, one cannot expect a perfect blending of color of inlay to tooth structure, or even a fair match. Quite to the contrary, if the inlay is a large one, the final result will be an opaque mass, resembling somewhat the appearance of a cement filling, and

FIG. 1.



appearing dark at certain angles under different lights, the same as a gold filling. If the inlay is small or a thin veneer, and a perfect match before cementing, it becomes an opaque mass with all of the above defects, as soon as it receives an underlying coating of cement.

With large proximal inlays not only must the underlying color and the general appearance of the tooth itself be noted, but also the tone or tones of the adjoining tooth or teeth have to be taken into consideration. We generally find, under normal conditions, the underlying colors in the average tooth to be: at the cervical margin some tone of yellow or brown; central portion some tone of yellow, gray or blue, and at the cutting edge some tone of blue or white. (Fig. 1.) These colors, properly noted, selected, and packed in the matrix by the operator conversant with the conditions, in such a manner as to allow one color to show through all

or a portion of the other, so that there will be a gradual intermingling of the tones, the underlying effect thus produced will resemble the bony structure of the tooth. Over these underlying colors, select for the last baking an enamel color matching the enamel of the tooth or the general appearance. Then, if necessary, the corner may be tipped off with the proper shade of blue or white, as the adjoining teeth may indicate.

An inlay made in this manner will be a translucent life-like restoration, blending with the tones of the tooth, and one that will absorb light and has little or no tendency to appear dark after setting. The translucency depends a great deal upon the porcelain selected; generally the higher the fusing, the greater the translucency. If the adjoining teeth be of different tones and the inlay matches the tooth in which it is placed perfectly, the effect will not be the best; that is, the inlay will be easily detected at first glance.

In case the adjoining tooth contains darker tones, as indicated in cut, the tones in the inlay should be darkened as they approach this tooth. In other words, an inlay should blend in color with the tooth along the cavity margins and with the adjoining tooth along its proximal portion.

In many instances the underlying effects can be produced and made to look more natural by allowing much darker shades than are indicated in the teeth to diffuse through overlying shades. Of course, a great deal depends on the operator's knowledge of the possibilities of the porcelain he is using, just what may be expected from confining one color within another, and the result produced by covering over a certain color with one or two others.

If after the greatest care in the selection, and the manipulation of the shades, an inlay is found off color upon removing the matrix the defect can be easily altered by the use of oil or mineral stains—mineral stains preferred.

In one baking they become a part of the inlay and impart the desired tone with a fine enameled surface, which can be partly removed, leaving a surface not as highly glazed, but permanent in the secretion of the mouth, a surface that is often desirable.

With an oil stain it is different, it being necessary to bake twice, once for the color itself and a second time for the flux or enamel covering, which, if afterwards ground, leaves a rough, un-

finished surface, one that is very likely to change in the saliva.

One should be careful in selecting these glazes, for there are several that give a very beautiful surface, but lose their enameled appearance and may be scraped off like so much chalk after being in the saliva a short time.

Mineral stains may be used to advantage in several different ways in all branches of porcelain art.

One use is made by applying it to the surface as an overlying glaze, and another by using it to produce underlying tones.

An inlay, crown, or denture of any description, that is too light, or off color when finished, may be darkened one or two shades, or

FIG. 2.

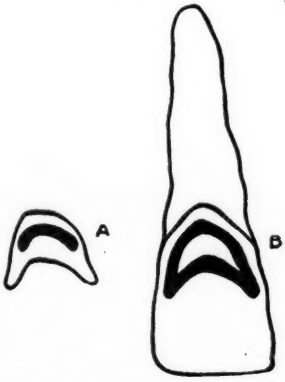
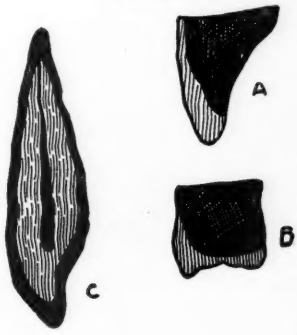


FIG. 3.



its color changed entirely, by applying thin or thick, even or varying coatings of the proper shades to the outer surface or surfaces, according to the result required. It is well to remember that it is more difficult to obtain a lighter effect, once the work is too dark, than to change from a light to a darker tone.

In inlay work the same results may be produced by using a basal color or colors on the under surface of the inlay in grooves or concavities.

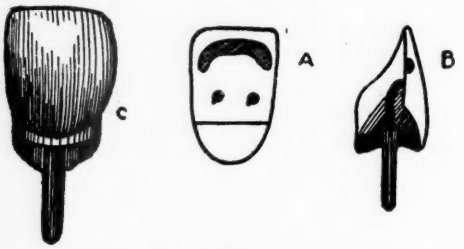
If the inlay be made of any of the high fusing porcelains, these underlying translucent tones may be obtained after removing the matrix without any change in shape or alteration to the margins, by grinding a groove in the under surface of the inlay opposite the surface to be altered, as indicated at A in Fig. 2, and then filling

in this concavity flush to its edges with a dark mineral stain, being careful not to allow any of the porcelain particles to remain on the surface and thereby spoil the fit of the inlay. However, if such a thing should happen, it is easily detected on account of its pronounced color and may be removed with a carborundum stone. The depth and shape of the concavities depend on the color to be used, the result desired, and the translucency of the porcelain through which these underlying colors must diffuse. In B, Fig. 2, is shown a stained inlay in position.

I use these principles in all branches of porcelain work to great advantage, in fact, in all cases where I have to deal with shades, and I find it is the only method whereby I can control the tones and obtain natural results. To my mind, this is the only apparent solution for the shade problem.

The same thing may be said of a crown as of an inlay, that is, if a crown be carved out of one color of porcelain, no matter how

FIG. 4.



translucent the porcelain may be, the result in the mouth will be an unnatural appearing restoration. In other words, a new tombstone erected over the remains of a neglected member.

In the construction of artificial teeth the manufacturers have for many years used underlying colors, mechanically blended together to produce natural and artistic effects. The modern porcelain worker therefore will profit by studying certain makes of teeth and determining for himself how the colors are manipulated to produce natural shade effects.

Upon observation it will be noticed that the bulk of the artificial tooth, or that portion representing the dentin, is of a dark shade, while the cutting edge and lingual surface is of an entirely differ-

ent shade, as shown in cut, Fig. 3, A and B. This same difference, but extended to the lingual as well as labial surface, will be found in the cross section C of a natural tooth. By following this rule in packing and carving all-porcelain crowns for a short bite the very best results are obtainable.

The most practical crown, taking everything into consideration, in all but a few cases, is a crown constructed with a facing upon a platinum base.

As this paper only deals with the shade problem, I will not go into details as to construction, but simply confine my remarks to the application of colors.

For the construction of such a crown, select a high fusing translucent facing as near the proper shade as possible. If the facing happens to be too light along the cervical margin, and a more yellow color is desired, by grinding the facing very thin at this point and using a dark yellow color for the first baking, the facing may be changed to suit the case in hand. If the crown be an incisor, for the second and probably the last baking, use a lighter overlying enamel shade, corresponding with the general appearance of the surrounding teeth. However, if the crown is a bicuspid or molar, it is almost impossible to finish off in two bakings on account of the shrinkage. When the crown has an articulating surface and the facing selected is of the proper shade, use a yellow or brown shade for the first baking and the same colors again for the second baking; carving the crown to the shape and size desired. After the shrinkage that takes place in this firing there will remain just enough space for the enamel or last baking. If the surrounding teeth are yellow at the gingival margin, and change suddenly to a blue along the grinding surface, this characteristic blueness of the cusps may be reproduced in the artificial crown by fusing a basal mineral stain upon the second baking at points indicated, and allowing it to show through the enamel coating. This will give a more natural effect than a blueness produced by selecting a blue enamel for the last baking. The translucent blue color often found along the cutting edges of the incisors is produced in a very easy manner by grinding a groove on the lingual side of the facing, as indicated in Fig. 4, A and B, and filling in with a dark blue shade of porcelain or a basal mineral stain, as described in the case of the inlay. If the blueness only

extends straight across the cutting edge and not down along the proximal walls, the groove should be straight instead of semicircular. The finished crown is shown by C.

The facing then may be used for the construction of a Richmond crown with a metal backing, but to better advantage in connection with an all-porcelain crown, filling in the lingual surface with a medium fusing porcelain, and thus confining within a dark underlying color.

This same method may be used with much higher fusing porcelains, but it is advisable to leave the groove unfilled, until just before the last or enamel baking, provided mineral stains are to be used for that purpose. Even after all the above attempts at reproducing nature's handiwork, the final result is often found wanting. Then, again, as a last resource, the mineral stains may be used to almost unlimited advantage as overlying glazes to imitate the color of the natural organs.

In the construction of an inlay, crown, bridge or any porcelain denture, the individuality of the case in hand should be studied and nature copied where natural teeth remain as examples.

By the use of carborundum stones and mineral stains, symmetry may be destroyed and the uniformity of color broken up, so that the artificial effect of a porcelain restoration is completely disguised.

In order to restore harmony to the features it is often necessary to reproduce wear, tobacco staining, pitted and clouded effects, streaked surfaces, abraded and discolored grinding surfaces, deposits in the fissures, and calcic deposits along the gingival margins. In fact, the possibilities along these lines for artistic effects are only limited by the operator's artistic manipulative ability.—*Dental Brief.*

SYMBIOSIS, WITH PARTICULAR REFERENCE TO THE BACTERIA OF THE ALIMENTARY CANAL. By W. D. Miller, D.D.S., M.D., Ph.D., Sc.D., Berlin, Germany. Read before a special joint meeting of the New York Odontological Society and the First District Dental Society of the State of New York, October 23, 1905. By "Symbiosis" (from *σὺν, together,* and *βιοῦν, to live*) we understand a living together, or

consortism—which may be either temporary or permanent—between animals or plants of different species, or between animals and plants.

According as this relationship results in advantage or disadvantage to one or the other of the parties, or in their mutual advantage, we designate it as parasitism, commensalism, and true or mutualistic symbiosis. (The term symbiosis is used by many authors to denote only those cases of relationship in which a distinct advantage accrues to each of the parties concerned.)

When one of the parties concerned in a symbiosis lives upon and at the expense of the other without making any return, we designate the relationship as parasitism (from παρά, *beside,* and σῖτεω, *to feed*), and the members of it as parasite and host. Numerous examples of parasitism in which the human body serves the part of the host are familiar to all, in the case of such parasites as fleas, lice, bugs, mosquitos, or, among the higher forms of parasites, tapeworms, trichinæ, etc.

Parasitism is exceedingly common in nature, more than one-half of all animals living a parasitic life.

The most important parasitism, as far as the human body is concerned, is that in which bacteria perform the part of the parasite; it being now well known that a large number of different kinds of bacteria are capable of living upon and at the expense of the human body—at the same time, by means of poisons which they produce, giving rise to by far the larger proportion of the diseases to which human flesh is heir.

When the relationship is such that one plant or animal lives from the superabundance of the other, from the crumbs that fall from its table, so to speak, it is designated as commensalism (*con,* together, *mensa,* table). This relationship is less common and is of a harmless nature. We have an example of it in the sparrows which frequent the cabstands in the streets and feed from the grain that falls from the feeding-troughs of the horses; or in the case of those animals, particularly foxes, that follow the trail of the pekan or "fisher" (Pennant's marten). This animal often kills much larger game than it is able to devour, and the remains furnish a hearty meal for the commensalist, the only injury done to the pekan being an injury to its feelings, since, according to Long, it bitterly grudges a meal to the foxes and only gives up its

booty when overcome by the desire for sleep consequent upon an overhearty meal.

We have also numerous commensalists among the bacteria which are found upon the surface of the human or animal body, living upon dead material in the form of dirt, epithelium, secretions of the skin, etc., without manifesting any pathogenic action.

Finally, when the association results in some distinct advantage to both of the parties concerned we have a true or mutualistic symbiosis. Of this many cases have been recently brought to light, some of which are apparently exceedingly wonderful and interesting in their nature. One of the best-known examples of true symbiosis is to be found in the relationship between the hermit-crab and sea-anemone. This crustacean, which for the purpose of protecting its soft body takes refuge in the deserted shell of some mollusk (periwinkle, whelk), is frequently observed to be carrying about one or more sea-anemones attached to its shell. It has furthermore been noticed that when the sea-anemone is removed from the shell of the crab and placed at some distance the crustacean is evidently disconcerted thereby, and hunts about until he finds his partner again, when he seizes it with his claws and replaces it upon the back of his shell.

It is evident that this relationship results in a decided advantage to the sea-anemone, inasmuch as it, being carried from one place to the other, comes into contact with fresh food, to say nothing of the fact that it partakes of the food collected by the crab.

Why the crab should be so desirous of having the sea-rose on his shell, and what advantage he could derive from it remained a riddle until an observation was made in the aquarium at Naples which seems to furnish a perfect solution of the problem. A devilfish was seen to approach the hermit-crab and insert one of its arms into the shell for the purpose of dragging out the inmate, whereupon the sea-rose shot forth a number of tentacles upon the arm of the devilfish, which, stung by the nematocysts with which the tentacles of the sea-rose are armed, withdrew in haste and desisted from its murderous attempt.

A species of crab has recently been described which goes about with a sea-anemone in each claw as a protection against the attacks of the devilfish.

Numerous cases of symbiosis no less interesting than the above

will be found in works on natural history and related subjects (von Kerner, "Pflanzenleben;" Weismann, "Descendenz-theorie," etc.), such as that of the pea-crab, which inhabits the mantle cavity of certain marine mollusks, particularly of the pinna tribe, hence the name *Pinnotheres* (Pinna-guard). It is said to keep a sharp lookout and to advise its more sluggish companion of the presence of food by a delicate pinch, as well as to warn him of danger—perhaps by two pinches! As a reward for its watchfulness it is allowed to share in the food. "Thus fed by mutual aid, the friendly pair divide the gain and all the plunder share."

Another case frequently cited is that of ants and certain plant-lice (aphidæ). The ants protect the lice against the attacks of insects, and receive in return a certain sweet excretion of the lice termed honeydew, which they cause them to give out by striking them with their antennæ—a process which is designated as milking. The ants even take these lice with them into their nests and care for them pretty much as the farmer does for his milch cows.

Many cases, likewise, of true symbiosis between different plants are well known and have frequently been referred to by biologists, the most common being that between algæ and fungi, giving rise to the compound organism termed linchen. In this association the alga is said to furnish the carbohydrates and the fungus the water and mineral constituents necessary for the life of the organism. Likewise the rootlets of many trees (beech, oak, silver poplar, as well as many plants of moor and woodland) are surrounded by a dense network composed of the mycelium of certain fungi. This mycelium collects the moisture for the tree, possibly also furnishes it with other constituents which it cannot of itself assimilate from the soil, and receives in return nourishment from the tree.

The most extensive of all symbioses, and the one which plays the most important role in the household of nature, is a kind of triangular or tripartite symbiosis, existing between the animal kingdom, the vegetable kingdom, and those lower forms of plant life designated as bacteria. The animal, not being able to derive its nourishment from the soil, is absolutely dependent either directly or indirectly upon the vegetable kingdom for its nourishment. The vegetable kingdom, which exists upon simple inorganic substances, such as carbonic acid, water and simple inorganic compounds of nitrogen, is dependent upon bacteria for the

constant renewal of these substances, which, without their aid, would long since have been exhausted. The bacteria decompose dead animal or vegetable matter, and convert it back into these substances from which it was built up, and which are absolutely necessary for the continued existence of higher vegetation. In short, the animal kingdom is nourished by the vegetable kingdom, the vegetable kingdom in an essential manner by bacteria, and the bacteria by both the animal and the vegetable kingdom; accordingly, the necessary conditions for the existence of both the animal and vegetable kingdoms are brought about by the agency of bacteria.

Aside from this process, which is going on everywhere on the surface of the earth where vegetation exists, and in which nearly all existing kinds of bacteria may take part, it has been discovered that groups of bacteria working together are not only able to produce ammonia by a decomposition of organic matter, and to transform this ammonia into nitrite, and nitrite again into nitrate, making the nitrogen available for plant growth, but that certain bacteria of the soil, designated as nitrogen-fixing bacteria, have the power of taking up *free* nitrogen from the air—a faculty heretofore not observed in connection with any form of plant life, and certainly not possessed by any of the higher plants. These bacteria are found diffused throughout the rootlets of different vegetables, especially legumes, or in the form of nodules upon the rootlets. It is possible, if not probable, that various kinds of bacteria possess this property, though up to the present time only one (*Bacillus radiciola*) has been obtained in pure culture. Extensive experiments carried on in different parts of the United States have shown that when seeds are inoculated with this bacterium before sowing, a yield may be obtained which is two to five times as large as that obtained from non-inoculated seeds, and there is great reason to hope that large tracts of land which have been completely exhausted of their nitrogen by careless farming may by these means be restored to their original fertility.

The all-important role which bacteria have thus been shown to play in the household of nature has led to the supposition that the immense numbers of them found in the alimentary canal exist in a true symbiotic relation to the human body, and that they not only aid in the process of nutrition, but are absolutely essential to it.

The claim has been urged—

(1) That bacteria, being vegetable, serve as food for the organism in whose alimentary canal they are found.

(2) That they not only aid in but are absolutely essential to the chemical process of digestion.

(3) That they serve to keep processes of fermentation and putrefaction under control and to restrict them within proper limits.

(4) That the more or less irritating products resulting from their action upon foodstuffs are required to excite the peristaltic action of the intestines.

It seems to me, however, that the first claim can hardly be seriously entertained. They are produced in by far the greater part in the alimentary canal itself, and if it were true that they may be utilized as food they could hardly give back to us any more than they take from us. As a matter of fact, we know that they pass off not only undigested but not even devitalized, one-third of the excreta consisting of living bacteria alone. (Metchnikoff.)

The second claim rests upon a much more solid foundation, and it is to a careful consideration of this phase of the question that I wish to invite your attention.

We know that our foodstuffs must undergo certain changes in the alimentary tract in order to prepare them for the process of absorption and assimilation; starches must be converted into sugar, the proteids into peptone, fats must be emulsified, etc. These changes are brought about by ferments (ptyalin, pepsin, trypsin, pancreatin, etc.) which are found in the saliva, the gastric juice, the pancreatic juice, etc.

Now, we know that there are immense numbers of bacteria constantly present in the human mouth, and far greater numbers still —estimated on an average at 180,000,000,000,000—in the intestines (Strassburger), and that these bacteria possess in different degrees the same properties as the physiological ferments above mentioned. The conclusion appears, therefore, perfectly natural that the bacteria of the alimentary canal, while they live at the expense of their host, more than compensate for the food which they consume by the part they take in carrying on the process of digestion.

This supposition, to which Pasteur first gave expression

(*Comptes rendus de l'Académie de Médecine,* vol. c, 1885, p. 66), was placed upon an experimental basis by the experiments of Professor Schottelius at Freiburg. Schottelius (*Archiv für Hygiene,* 1898, Bd. xxxiv, p. 210, and 1902, Bd. xlii, p. 48) sterilized hen's eggs by immersing them in a solution of corrosive sublimate which was afterward thoroughly removed by treating with alcohol; hatched out the eggs in a sterilized incubator, and fed the chicks on sterilized food. They ate voraciously, but did not grow in proportion; on the other hand, they gradually dwindled away and died in the third or fourth week after hatching. If, however, at any time during the experiment a small quantity of hen's dung was added to the food, by which the normal bacterial flora of the alimentary canal of the hen was introduced into the alimentary canal of the chicks, a change was immediately brought about, and from that moment the chicks revived and developed in a perfectly normal manner.

This question appears to me to be one of great general importance, and of especial importance to the dentist.

We have been teaching that bacteria are not only the cause of decay of the teeth, but of a large number of diseases and disturbances resulting therefrom, as well as the cause of many diseases of the mouth and throat and neighboring parts originating independently of the teeth, and that it is our duty to keep down the number of bacteria in the mouth as far as possible. We are now told that this is all wrong, that the human mouth is and should be the recruiting place for the bacteria of the alimentary canal, that they are necessary for the process of digestion, and that we should avoid the use of antiseptics as well as of other means which may inhibit or disturb the process of incubation in the mouth. The experiments of Schottelius appear to have been carried out in a most careful manner, and it is difficult to find any source of error in them, so that we are forced to conclude that as far as chicks are concerned bacteria do perform the role which has been attributed to them. It is by no means sure, however, that this result can be generalized. Mme. Metchnikoff, experimenting on tadpoles, found but a slight difference to the advantage of those fed normally over those which were fed with material free from bacteria, and we know that there are certain animals (scorpions, larvæ of moths and other insects) whose ali-

mentary canals contain no bacteria, but which nevertheless make use of substances as food that are very difficult to digest.

Finally, Thierfelder and Nuttal (*Zeitschrift für physiolog. Chemie,* 1895, p. 109), experimenting on guinea-pigs, aseptically taken from the mother and fed on sterilized food, found that they developed in an almost normal manner, despite the fact that animals as well as babes prematurely born are backward in growth and strength as compared with those born normally. At the end of thirteen days the animals were killed, and the alimentary canal was found, as a matter of fact, to be free from bacteria. Unfortunately, the strain of being obliged to care for the animals during the hours of the night rendered it impossible for the experimenters to carry out this experiment for a greater length of time.

Levin's statement that the alimentary canal of polar bears contains no bacteria seems to me to depend upon an error of observation. It is difficult to understand how these animals could have existed for ages without having once come into contact with any food containing bacteria, which having once obtained access to the body of one bear only, would naturally not have been influenced by the cold without, and would then have been communicated from one animal to another until they all became inoculated untold ages ago. There is nothing in the alimentary canal itself or in its juices which prevents the growth of bacteria, and the feces of the polar bears in zoölogical gardens contain bacteria in abundance.

There are, however, considerations apart from the above observation which render it difficult to accept the proposition that bacteria are necessary agents in the chemistry of food digestion.

In the first place, the ferments in the different juices of the alimentary canal are, as is well known, able to carry on the process of digestion without the assistance of bacteria.

As for the diastatic action of bacteria in the mouth, it must be considered insignificant as compared with that of the ptyalin, since we know that the latter acts immediately upon the starch, whereas the bacteria of the mouth, as far as they have been studied with reference to this point, act but slowly and feebly.

Again, there is but a slight possibility that bacteria can in any way aid the process of digestion in the stomach. Not only does the acidity of the contents of the stomach inhibit the develop-

ment and action of bacteria, but we know that when for any reason (whether it be because we have taken more food than the stomach is able to care for, or that there is a mechanical or chemical insufficiency of the stomach) an excessive development of bacteria and correspondingly intense processes of fermentation *do* take place in the stomach, digestion is not only not aided thereby, but serious disturbances result which manifest themselves not only in catarrh or inflammation of the mucous membrane of the stomach, but in general symptoms, such as nausea, headache, vomiting, etc. The aid of bacteria in gastric digestion is synonymous with a "deranged stomach."

We must accordingly restrict ourselves to the intestines in the search for any confirmation of the supposition with which we are dealing.

The possibility of bacteria acting as aids to intestinal digestion rests with the decision of the question whether they do or do not convert considerable portions of the proteid substances of the food into peptones, and while we must, of course, acknowledge that many bacteria of the alimentary canal may possess the power of peptonizing albumin, yet it appears that the "most important bacteria of the intestines as a rule do not attack proteid substances, and in particular do not peptonize them." (Schmidt und Strassburger.) Furthermore we must not forget that bacteria themselves require peptone, and we have no proof for the supposition that they create peptones in any considerable quantity above that which they require themselves, and when we take into consideration the fact that one-third of the feces consists of bacteria we must acknowledge that great quantities of peptone are necessary for supporting so prolific a vegetation. On the other hand, we are not even in a position to prove that the bacteria of the intestines, instead of converting albumin into peptone, do not take the shorter and more convenient route and make use of the peptone produced by the normal physiological process of digestion. This would be in full accordance with the principle that functions and even organs which have become useless tend in the course of time to disappear, and as the tapeworms (*Cestoda*), which—living in or upon media containing food already digested and prepared for assimilation—have lost the power of carrying on the process of digestion and are not even provided with digestive organs, so

it becomes a question whether bacteria which have grown for generations in a medium rich in peptone do not lose in part at least the power of peptonizing albumins.

Bacillus radicicola offers some very suggestive facts in this connection. This organism was first cultivated by Nobbe and put upon the market under the name of "nitragin." Experiments made in inoculating seeds with this material did not lead to satisfactory results, so that the preparation was withdrawn from the market. When the matter was taken up by the Bureau of Agriculture at Washington, they succeeded in producing cultures which accomplished the desired results and by means of which wonderfully prolific growths of alfalfa, clover, wheat, etc., could be obtained. This marked difference in the action of different cultures of the same organism has been accounted for by the fact that the culture media made use of by Nobbe were rich in nitrates, and the bacillus, not being required to draw upon the air for its supply of nitrogen, lost in a great measure the power to do so.

Again, it is very well known that the process of digestion as carried on by bacteria outside of the alimentary canal not only results in the peptonization of albuminous substances, but also in the production of substances which render the foodstuffs undergoing such digestion unfit for food, if not absolutely dangerous. Bacterial digestion gives us the rotten egg, the decaying vegetable, the spoiled meat, fish, oyster, etc., which are not only unfit for food, but in some cases violently poisonous.

This suggestion is also corroborated by experience, for it is perfectly well known that when an overgrowth of bacteria takes place in the alimentary canal and the normal process of digestion is replaced by bacterial digestion, not only severe local disturbances but general intoxications in more or less pronounced degree are the result.

Finally, we must not lose sight of the important fact emphasized by various authors, that digestion takes place in the small intestine, and virtually ceases when the large intestines are reached. This is just the opposite of what should be expected if the bacteria were there to assist in the process of digestion—since we find comparatively few in the small and myriads in the large intestines; and Metchnikoff, after pointing out the various disturbances which result from absorption of poisonous products of

bacterial action in the large intestines, comes to the conclusion that this part of the alimentary canal is not only not necessary for digestion, but on the other hand is a constant menace to health and even life. He cites the case of a woman in whom a fistula had led to a total atrophy of the large intestines. She lived, notwithstanding, over thirty years in this condition, becoming the mother of three children, whom she was able to support by the work of her hands. Metchnikoff suggests the possibility that the skill of the surgeon through further development may reach so perfect stage as to make it possible to remove the large intestines as a prophylactic measure and thus avoid the many dangers to which they give rise.

In regard to the activity of bacteria in the mouth—which naturally interests us in particular—we have seen that there is little reason for attributing to them any role of importance in the process of converting starchy substances into sugar, whereas, on the other hand, it has been perfectly well established that they are the cause of all those various processes of fermentation, particularly of carbohydrates, which result in the final destruction of the teeth. It is true that attempts have been made recently to attribute the formation of acid in the human mouth to other causes. At the meeting of the Fourth International Dental Congress in St. Louis, Hinkins of Chicago (*Dental Cosmos,* March, 1905) advanced the idea that the ptyalin of the saliva not only converts starchy substances into sugar, but goes still farther and transforms sugar into acid, thereby leading to the destruction of our cement fillings and to the production of caries. I have dealt with this question in the *Dental Cosmos* for November, 1905, and have reached the conclusion that the results of the experiments carried on by Hinkins are not sufficient to establish the point which he claims (see *Dental Cosmos*).

Again, Lohmann of Cassel maintains that there can be no fermentation in the mouth because the food remains too short a time to be acted upon by the ptyalin, and that, anyway, starch is not converted into dextrin but into maltose by the action of ptyalin, and that maltose and other representatives of the cane-sugar group are not fermentable. I have also shown the absolute untenableness of this view of Lohmann in the article referred to, and will only say in this connection that the bacterial origin of

processes of fermentation in the human mouth has been established beyond any question, and that it is highly desirable that persons advocating contrary views should not bring them before the profession until they have thoroughly worked them out and are able to furnish reasonable proof of their correctness.

In view of the many reasons presented above, I think we are justified in having serious doubts respecting the utility of bacteria in the alimentary canal as aids to digestion. On the other hand, it is universally admitted that the overgrowth of bacteria everywhere interferes with the normal and healthy process of digestion, and invariably leads to more or less serious disorders, and that as far as the care of the mouth is concerned the more thoroughly we can prevent the growth of bacteria the more we shall be able to limit the ravages of decay and the more shall we be able to eliminate various local and general diseases for which the human mouth furnishes a point of entry. A healthy mouth is a most potent factor in bringing about and maintaining a healthy condition of the body; a diseased mouth, containing myriads of bacteria, is a constant source of danger to its possessor.

The question presents quite a different aspect in case of animals whose food (grass, hay, straw, etc.) consists largely of cellulose, and I think that Schmidt and Strassburger ("Faeces des Menschen," 2d ed., p. 299) are probably not far from right when they say "The life of higher animals in which the breaking up of cellulose and the consequent utilization of the food in the process of digestion performs the chief role, cannot be maintained for a great length of time without the aid of bacteria."

This fact hardly comes into consideration in the case of human beings, whose chief foods contain but a small percentage of cellulose:

Rice	0.2	per cent
Rye meal	1.8	" "
Wheat	2.9	" "
Potato	3.1	" "
Beans	4.1	" "
Peas	6.4	" "

—percentage of the dry substance.

To the cellulose of our food is consigned the very important function of keeping up the peristaltic action by means of the

mechanical irritation exercised upon the walls of the intestines by such material, and it is a question whether its solution by bacteria would not be a positive injury, inasmuch as it is known that the absence of this irritation results in chronic obstination.

Notwithstanding the above facts and conclusions, it is (3) quite possible—if indeed it may not be considered as an established fact—that there are certain kinds of bacteria in the alimentary canal which may be looked upon as benefactors, not because of any direct symbiotic relation to the human body, but because of their antagonism to other and harmful bacteria.

It has been pretty well established that in all of the cavities of the human body communicating with the external world there are certain bacteria which appear soon after birth and which may be considered as the specific flora of those cavities. They apparently perform a beneficent röle in virtue of their antagonism to other bacteria, by inhibiting or at least limiting the growth of extraneous bacteria, both pathogenic and non-pathogenic, which from time to time obtain access to the cavities in which they have become established.

I have discussed this problem under Question VII, page 91 of the *Dental Cosmos* for February, 1903, and will consequently refer the reader to the article in question without repeating the considerations there presented, except to say that in all probability a very important role is performed in the human mouth by certain bacteria which prevent the pathogenic micro-organisms which are constantly obtaining access to the oral cavity from obtaining a foothold, or at least have the tendency to modify their growth and attenuate their virulence to such an extent that the danger incurred by their presence is reduced to a minimum. In the alimentary canal it is chiefly the B. coli and B. lactis aerogenes (acid producers) which by bringing about an acid fermentation of the carbohydrate constituents of the food give rise to the production of lactic acid, which has the effect of inhibiting or restricting the growth of the putrefactive bacteria, and thereby prevent the intense processes of putrefaction which always give rise to serious disturbances. The acid reaction is, however, not the only factor to be taken into consideration in this connection. Quite as important is the antagonism in the struggle for existence which may exist between different kinds of bacteria and which apparently

does exist between B. coli, etc., and the putrefactive bacteria of the intestines.

It is an interesting fact that one of the bacteria to which this function has been attributed (B. coli) is itself pathogenic, and becomes an element of great danger to the human body whenever it escapes from its strict confinement within the walls of the alimentary tract.

Thus we have in the intestines two hostile groups of bacteria antagonizing each other, each one being present presumably for the purpose of keeping the other within proper bounds. The intestines themselves are a sort of neutral fighting-ground, and are very frequently made to suffer from the depredations carried on by one or the other of the two hostile parties. The advantages accruing to us are very problematic, particularly as we must feed both armies free of cost and are in constant danger of being wounded by stray shots.

In still another way (4) the bacteria of the intestines are supposed to exert a very important action, as is claimed; that is, by the production of volatile fatty acids, gases, etc., which have the effect of exciting the necessary peristaltic action. When the development of bacteria and the corresponding products of decomposition are deficient the intestinal peristalsis becomes feeble and constipation results. We have seen above that the peristaltic action is kept up also by the mechanical action of undigestible woody fibers (cellulose) of our vegetable foodstuffs.

We have, finally, to deal not only with the possibility of antagonism, but it has also been equally well established that we meet with symbiosis between different kinds of bacteria, and bacteriologists have discovered that different kinds will grow together on culture media where one or the other of them alone shows no development. Kohlbrugge isolated two different bacteria from the soil which, together, peptonize albumin, while either of them alone is completely devoid of this power. I have also found that one kind of bacterium seldom or never produced more than 0.75 per cent of lactic acid in solutions of bouillon with sugar, whereas the same bouillon infected directly from the mouth, and consequently containing different kinds of bacteria, will take on a much higher degree of acidity; and in mixtures of saliva with foodstuffs I have frequently observed a degree of acidity corresponding to

two per cent of lactic acid. Frohmann likewise found that two species of bacteria isolated from carious dentin associated together produced a much more intense fermentation than either alone.

It is consequently an exceedingly complicated problem with which we have to deal in the attempt to solve the question of the absolute or relative immunity of certain persons to caries of the teeth, as well as to other diseases of the mouth. We have not only to deal with the chemical and physical properties of the food, with the structure, shape, and relative position of the teeth, with the condition of the gums, the amount of saliva and its chemical and physical properties, with the number and different kinds of bacteria present, but also with the possibility of antagonisms and symbiosis between different kinds of bacteria in the mouth; and when we remember that it is more than a life-work to make a study of all of the different kinds of bacteria met with in the human mouth, we then appreciate the vast amount of work which will be necessary to investigate the action of these different bacteria with respect to the total sum of all their activities resulting from antagonism and symbiosis when associated as they are in the mouth.

In my earliest communication on the subject of the bacteria of the mouth and of processes brought about by them, I insisted upon the necessity of experimenting under conditions resembling as nearly as possible those which are present in the human mouth. Other authors, even in more recent publications, have shown an inclination to attach undue importance to pure cultures alone, and to criticise my work in this connection. It now appears that my standpoint was the correct one, and had it been adhered to by other investigators in this field we probably should be farther advanced in our study of the bacterio-pathology of the human mouth than we are. As long as we confine our investigations to a study of the action of bacteria in pure cultures only, we shall never be able to acquire a thorough understanding of the manifold and complicated processes which are going on in the human mouth.

An equally important and difficult problem is that of the relative immunity of the soft tissues of the mouth to infection. It is a fact of common knowledge that these are much less liable to infection than the other tissues of the human body, and that such a wound as that produced by the extraction of a tooth if made

under the same conditions in any other part of the body would almost invariably lead to severe infection, whereas in the mouth such a result is fortunately the exception.

I have shown that this fact is not to be attributed to any protecting antiseptic power manifested by the saliva, and the only explanation which we have been able to find for it rests upon the positive chemiotactic properties of the saliva, as the result of which myriads of leucocytes accumulate in the wound made by extraction, for example, and take up a large number of bacteria which obtain access to the wound, thereby contributing in a large degree to the process of purification; and, except we take into account the mechanical resistance offered by the dense structure of the gum tissue and by the epithelial covering of the mucous membrane in general, no other factor has been found up to the present which helps to furnish an explanation of the phenomenon in question. In our future work in this line we must also take into account the antagonism which undoubtedly exists between different kinds of bacteria in the mouth, and which may lead to so marked a diminution of the virulence of pathogenic bacteria —if it does not even restrict or inhibit their growth—as to render them comparatively harmless.—*Dental Cosmos.*

EMPIRICISM IN DENTAL SURGERY. By A. Hopewell-Smith, L.R.C.P., M.R.C.S., L.D.S.Eng. Read before the annual meeting in London, May 17, 1906. Thirty years ago there was published in London a small brown-covered volume, entitled "Vernon Galbray, or the Empiric," written by an anonymous author. It represented, at the time it was presented to the lay, as well as to the dental world, the then elastic condition of things, and attempted, in the similitude of a slight novel, to show the chaotic state of dental ethics, the absence of regard for *meum* and *tuum,* and the formulæ of establishing a practice and gathering together riches by methods of empiricism and blatant charlatanism.

EMPIRICISM DEFINED.

It is not of this kind of empiricism, however, of which I wish to speak. It is the philosophical interpretation of the term which I am now employing, viz., "the system which, rejecting all *a priori* knowledge, rests solely on experience and induction," or, as other-

wise expressed, "dependence on mere observation and experience, to the exclusion of scientific knowledge, or the knowledge of the connection between cause and consequence in any particular case, as in the use of a remedy in any particular disease." In a word, that empiricism which is the enemy of science.

Moreover, I do not intend to give to my hearers a profound divagation on this subject; time and, I fear, incompetency to deal fully and properly with it, deter. My object is more to suggest than to indicate, to give pause to think than to establish hard-and-fast rules and doctrines. Mere *obiter dicta,* and no more.

Now it is obvious that all things must originally have been based on empiricism. The man who first designed and erected a habitation for himself knew nothing of architecture. As a consequence of his experiments and ascertained results, he built the dwelling. The science and art of medicine and surgery were similarly founded, in darkness, on experience and on operations designed to discover some unknown truth or principle. Hippocrates, Galen and other forerunners of the healing art had received no special knowledge or training; but gradually, as the dawn began to break, science stepped in and successfully asserted her claims, and to-day, in full light, surgery is practically free from empirical methods of observation, experiment and treatment. And it was so with our own profession. Our forefathers in dental surgery, lacking specific scientific instinct, training and wisdom, adopted the crudest methods of practice, and cared not to inquire into the whys and wherefores, or the logical consequences of the junction of the normal with the abnormal, or the causation and the gamut of the studies of the phenomena of disease.

We, practitioners of the Twentieth Century, pride ourselves, more or less, on the rapid advancement of our particular calling. The present condition of dental surgery in England may be aptly compared to the physiological process which a caterpillar undergoes when shedding its skin preparatory to its increase in growth and development, and to its passing into a puparial state. The days when the same larva will have reached the imago phase of its existence seem far off.

In the hurry of practice and the wear and tear of life, there appears to be but little opportunity for pausing and examining closely the questions of the conditions which determine the ideal

growth and aspirations of dental surgery. There are many factors at work keeping back its real progress. If there is no true progression there can only remain retrogression. Recidivation is so easy and so dangerous.

EXAMPLES OF EMPIRICISM.

Empiricism appears to be most apparent in our daily intercourse between our patients and ourselves. Take, for instance, the employment of drugs used in the alleviation of that special kind of pain which comes under our immediate notice. How many are used empirically and wrongly! Instead of being content to employ the simplest processes possible, and the pharmacopœial preparations whose physiological and therapeutic properties are well understood and have combated successfully the tests of time, we find that modern and progressive surgeons, as the result of chemists' advertisements, rush to obtain new chemical compounds and to immediately apply them to the vital tissues of the mouth. It is unnecessary to name more than a few of these recently introduced drugs—erythophlein for obtunding sensitive dentine, novocaine, nervoicidine, stovaine, pental, etc., for anesthetic and analgesic purposes. From the chemical point of view these and other *materies medica* may and possibly do represent the highest degrees of thought and research and scientific manufacture, but as far as we are concerned we ought not to use them unless and until we become thoroughly acquainted with their chemical composition, the nature of their compatibilities and incompatibilities, their exact action on the protoplasm in the dentinal tubes, the collagen of the dentine, the inorganic salts of enamel and the epithelial and soft tissues of the pulp, peridental membrane and gingival environment of the teeth. We are daily practicing empirical and non-articles, ("It should be a fixed principle with every intelligent and articles ("It should be a fixed principle with every intelligent and conscientious practitioner that he should not use, prescribe or recommend for his patients, who rely upon his professional knowledge, any proprietary preparation of which he does not know the composition."—Dr. Harold Clark at the Ontario Dental Society, Canada), and we are daily weakening our grasp of the principles of science and unconsciously degenerating into rule-of-thumb practitioners (Benjamin Franklin said, "Experience is a dear school,

but fools will learn in no other."). How much do we really know of the pathology and etiology of the diseases of the teeth and mouth which we are called upon to treat and how few attempts do we make to attain to higher scientific achievements?

Take, again, further, the use of arsenious acid for the devitalization of the pulp. This was introduced by Spooner in 1836, and for seventy years it has had the reputation of being a useful agent for this purpose. But that it is not altogether satisfactory is evidenced by the fact that attempts have been made from time to time to discover some more efficient substitute. Its use was, and is, largely empirical, and with this knowledge the plan of pulp digestion by means of papain or pepsin has been tried and advocated by Harlan. Here was a step in the right direction, but it never has been universally acknowledged to be the best method of destroying the pulp.

Again, mummification of this organ, proposed by Witzel in 1874, and later improved by Söderberg, has been adopted by some, again by no means satisfactorily. Pressure anesthesia and pulp removal by means of a broach is the latest plan of treatment. Its use, however, is contraindicated in inflammatory conditions of that tissue.

If the mind is divested of all preconceived ideas on the question of the killing of the pulp, and if empiricism be forgotten, and the scientific principles embodied in general surgery be applied to the case, another and more certain method might be welcomed. Suppose, for a moment, that the tissues of the mandible were rendered transparent as glass—the cheek muscles, the soft tissues clothing the alveolar processes, and the bone itself, with the containing teeth. Suppose, also, that the inferior maxillary division of the trigeminal nerve remained opaque, and could be readily seen *in situ,* with diagrammatic clearness, ending in multitudes of branches and inosculations in the pulp and root membranes of the teeth. It would seem, under conditions like these, particularly futile and undesirable for men to venture to dare to apply masses of arsenious acid to its free terminations. That is the dental way of doing things, but not the surgical scientific method!

If a surgeon had to treat a case of localized peripheral neuritis he would endeavor to excise or amputate the inflamed portion. He would not kill it by means of dangerous and noxious poisons.

If amputation could not be performed and nerve stretching was impossible, cauterization would doubtless be attempted. And it is in this direction that I think we should project our thoughts and practical researches. It should not be very difficult to destroy, under a general or local anesthetic, by means of the galvano-cautery or fine electrode, such as is used for electrolysis, the whole of the pulp tissue in cavity and root canals, and it is certain that the operation would be more surgical, more suitable and more scientific.

I expect to be informed that the same object would be accomplished by extirpating the pulp by means of an ordinary broach under an anesthetic. This is granted in cases where the root canals are easy of access, as in incisors and cuspids, but very difficult in bicuspids and molars on account of the frailty of the tissues of the pulp and the bending or twisting of the broach.

What do we know of the actual changes which take place during the phases of the so-called "setting" of an amalgam or cement filling, or the molecular alterations in the structure and physical properties of gold, which it undergoes when manipulated in the alcohol flame, or under the stress of the plugger? Daily familiarity with the common-places of work blunts our spirit of inquiry into these matters, and degrades our sense of responsibility in finding out their understanding. We use recognized methods, but our complete knowledge of these methods is often absent, and it ought not to be. ("Increase of right knowledge tends to increase of right conduct. A man who has knowledge is less ready to do wrong, because he foresees its evil consequences. A man who neglects to acquire knowledge is dangerous to himself and others." —Gore, "The Scientific Basis of Morality," p. 344, 1899.)

Our employment of chlorate of potash as a therapeutic agent in ulcerative or mercurial stomatitis is quite empirical. We do not know how it acts on the epithelial surfaces; we simply know that it is a beneficial drug.

Further, turn to the wide subject of the irregularities of the position of the teeth. Our modes of procedure, and rules and lines of treatment are mainly empirical. Until we are fully wise on the question of the etiology of irregularities, and of the pathological changes that have led up to them, and until we view the whole subject from a more philosophical standpoint than hitherto,

we shall be inclined to consider the treatment of these deformities as important but annoying, and relegate the whole of the department of pediatrics to a second or subsidiary position in our daily calculations. Much has been written in the pages of the *British Dental Journal* on "The Comedy of Lectures," and—though this is a digression—while I cannot agree with the Bishop of Carlisle, who is reported to have "warned his hearers not to place too much reliance on lectures, for the lecture was the most deceptive thing in the world—except a sermon"—I should like to express the opinion that the dental student would, I am confident, be greatly benefited, and be more adequately prepared for private practice, by attendance on a conscientious and exhaustive course of lectures on this subject, especially when approached from the aspect of pathology, philosophy and the science of mechanics. It is a much neglected item in our English system of training, and the newly qualified surgeon is often embarrassed as to the interpretation of signs and symptoms, and the correct scientific treatment of some of his earliest cases in practice. Far better a course of lectures on orthodontia than dental *materia medica,* and far better, too, that students generally should have a non-empirical knowledge of the principles which govern the correction of these defects of the jaws and teeth, than that a few dental surgeons should become specialists in that direction.

I should desire to have a real explanation of the physiological and pathological changes in the alveolar processes of the jaws which occur during the expansion of the arch by the wearing of a Coffin plate; I should like to have a real explanation of many of the causes of tooth degeneration. At a recent meeting of the Societé d'Anatomie de Paris, a M. Mendel declared that if a replanted tooth be microscopically examined *in situ,* having been immediately restored to its alveolar socket, no histological differences could be detected between it and the normal attachment, the root membrane performing its functions in the usual manner. But according to this author, if a non-newly extracted tooth be replanted, an ossifying process takes place, callus is thrown out, and the peridental membrane has no share in its formation! I cannot understand a statement like that.

In the official report of the "Proceedings of the Fourth International Dental Congress," I read in Section V, Oral Surgery,

some extraordinary views, of which I will here mention three. One speaker said: "Our oral surgery text-books—where are they? Our dental text-books—where are they? We have nothing but a rehash from morning until night. The books written for us to-day are not scientifically correct on the subject of dental pathology. When, a short time, I looked up in Wedl, Bödecker and Römer, the subject of neoplasms of the pulp, I found them classed as tumors of the pulp, while they are really polypi, hypertrophies or myxomas. Our terminology is very faulty." And again the same speaker remarked, "I have seen more than one tumor or neoplasm with the characteristics of four, or even five, different neoplastic varieties. What does that lead to? The surgeon will first find a small fibroid growth, and by taking a superficial cutting will discover on examination the fibers of a benign, not a malignant, tumor, but if the deeper tissue be examined the characteristics of angioma may be discovered, and if the still deeper tissue, those of a mixed form of sarcomatous carcinomata" (*sic*).

And lastly, another speaker announced it as a scientific fact that "In the union of a fracture (of the jaws) there is a formation of cartilage which will eventually become consolidated into bone!"

It is the dissemination in our periodical literature of pseudo-scientific doctrines and tenets like these which hinders the cause of real progress, discourages the spirit of true inquiry and encourages the growth of empiricism.

THE CAUSES OF EMPIRICISM.

The causes of this empirical factor seem to be the race for wealth, the hurry and scurry attendant on dental training, and the lack of interest in the advancement and promulgation of science. Before qualification a student has no time in which to prosecute original research; after qualification he has no thoughts to devote to anything but the heaping up of money or the pursuit of pleasure or outdoor occupations. ("Youth is the time to get knowledge and manhood the time to get money."—*Loc. cit.*, p. 360.) And all this leads to a failure of appreciation of the necessity for strenuous scientific work.

We have in our midst to-day too many disciples of the cult of the forceps. It is so easy to extract a tooth, and so difficult, at

times, to save it; and it is, in consequence, removed, to the equal detriment and disfigurement of the patient. The whole position is so illogical. The greatest stickler for etiquette in regard to dental hygiene and the toilet of the mouth, the most scrupulous of practitioners regarding asepsis and antisepsis, who often carries his profession to a rigid and great excess—even to the sterilization of the gas bag (the writer knew a man who, in the practice of dental mechanics, used to rinse out his vulcanizer and disinfect his flasks with a solution of carbolic acid!)—is often one who, the moment after sterilizing the oral cavity, puts in it a denture which cannot but shortly encourage the development of bacteria, and at once render nugatory the effects of the antiseptic treatment which he has been so sedulously applying.

And finally, empiricism is fostered and developed by what might be termed the "trade aspect" of dental surgery. Can anything be more repellent to one's ideas of what is right than to occasionally read in the daily press the editorial comments, as representing the attitude of mind of the public at large toward our profession, on current events? Thus a few weeks ago a leading Radical newspaper described as follows an exhibition which was being held of dental materials, etc., under the heading—Pshaw!—of "The March of Modern Dentistry."

"MARCH OF MODERN DENTISTRY."

"Rows of glittering steel forceps, bottles of anesthetics, trays of pearly white porcelain teeth, fearsome instruments that whizz as they bore their way, hypodermic syringes for piercing the gums and injecting cocaine, and electrically lighted mirrors for exploring the recesses of the human mouth. These and many other sinister-looking objects, calculated to revive painful memories of the bad quarter of an hour spent in the dentist's chair, will be found, etc. True, the exhibition is intended for the instruction not of the layman, but of the operator, whose stealthy step as he approaches, gripping the forceps, is one of the most uncomfortable sensations experienced by the patient."

And another daily journal wrote: "Timely with the chemists, yesterday at the . . . another fascinating display was opened . . . Here you may inspect, with a mind free from care, the treacherous and diabolical mechanism which makes the operating chair such a comfort and a snare. You may view, without alarm,

the charming preparation which 'mummifies pulp,' and the pleasing nerve-capper.'

"Obliging attendants will show visitors the process of 'excavating' by means of an electro-motor, and a minute scarifier and agitator which rotates in the pulp, round the ganglion (*sic*). There are floral designs in forceps, and Chopin is administered by a piano, while the mysteries of gum washes are explained by expert gum masons."

THE CURE OF EMPIRICISM.

Let us get rid of all traces of sciolism, and endeavor to add genuine knowledge to some branch of our work; let us forsake shams and build up a real structure, based on the highest surgical principles; let us avert our attention from false doctrines and study the latest teachings of science and research at home and abroad. Then we shall each and all elevate the position of English dental surgery, not only in the eyes of the public, but also, and more important still, in the esteem of the members of the sisters and allied professions, until we take our place as the most enlightened and scientific community of dental surgeons in the world.—*British Dental Journal.*

THE PROFESSIONAL RANK OF PROSTHODONTIA. By N. S. Hoff, D.D.S., Ann Arbor, Mich. In the minds of many in our profession, the branch known as Prosthodontia or Prosthetic Dentistry, carries with it the thought of less dignity, or a lower rank as to skill and importance, than the more distinctly operative or surgical departments. The idea probably has its origin from the fact, that more of mechanics is involved in the practice of prosthodontia than in therapeutics and surgery, and perhaps to the fact that in all times it has fallen to the lot of that portion of the profession, which is known more largely for hand-skill than for academic or scientific attainments. Whatever may be the cause for such distinctions being made, the fact seems so thoroughly embedded in the general public, as well as our professional atmosphere, that it would probably require some great genius in mechanics and art, to change these ideas. The undertaker may be an artist of the first rank in his line, but he will never be able to outrank the physician. And it is probably inherent

that after all the prosthodontist is a makeshift, or man of last resort, and cannot be expected to confer any great benefits of the natural character on mankind. He is, however, most useful in providing the means for artificial function when the normal is wholly lost; and consequently he is entitled to respect, in so far as he is successful in artistically mimicking nature, with his skill and art. This seems to be about the attitude of the general public to the prosthodontist and the average dentists estimate him in much the same manner.

It is unquestionably proper when it becomes necessary to make discriminations of this character, to grant that the man who co-operates with nature in rescuing a tooth from destruction or other impending disaster, which would compromise its functions or usefulness, has performed a nobler service than when he supplies an artificial substitute; and, when looked at from this viewpoint only, we may say that prosthetics or mechanical dentistry should rank second to the conservative departments. As, for instance, the optician does not rank with the opthalmalogist, and yet both are essential to the comfort and well being of the people.

It, perhaps, is not wise to pursue this line of thought further, to draw any clearly established reasons for the ranking of any calling above another. Hiram Goff, the shoe-cobbler, mending all his shoes with the motto of "always working to the glory and honor of the Kingdom of Heaven," before him, that is to say he mended every pair of shoes just as well as he possibly could do the work. And so it will appear that any and every good humanitarian service is honorable and equally meritorious.

The things, however, that we want to discuss in this short paper are the reasons why prosthetic dentistry is not pursued with the same serious devotion and by larger numbers of our profession, as are the surgical and so-called operative branches. At first glance one is tempted to cite the very obvious fact that the operative departments afford greater remuneration, and are more in harmony with one's tastes and inclinations. It is true that the average practitioner when he makes a prosthetic restoration, feels that he must exact no larger fee than the custom of the community in which he practices has established, never suspecting that every time he does so he contributes to the general belief of the public that all prosthetic operations of similar kind should be marketed at

a stated price, much the same as shoes or overcoats; the latitude of the wig maker, or the milliner's fee is not to be thought of. Every practitioner who has had any considerable experience in prosthodontia knows that there are no conditions in this work that will enable him to keep a stock or supply of ready-made appliances for sale at a fixed price. He also knows that to render a patient an adequate service he must train himself not only in the art and mechanics of construction, but he must be able to completely diagnose each case by itself, and design the complete structure before he undertakes its construction. The diversities of conditions to be met and mastered are in some cases beyond the capacity of the average practitioner, consequently he fails to satisfy his patient to his own hurt and disgust. This has driven more men to the practice of the more simple operative procedures, where nature generally comes to the help of the poor diagnostician or unskilled mechanic, than because dentists really believe that prosthetic dentistry is beneath their dignity as professional men. A mere mechanic may execute the design of the dentist when these are carefully planned just as the mechanic may construct the beautiful and useful building accurately and tastefully designed by the intelligent architect. We do not mean here to infer that the practice of shipping impressions to a satisfactory laboratory a hundred miles away will result in a satisfactory denture; but that much of the merely mechanical detail may be delegated to a well trained laboratory assistant, although, of course, they should be more intelligently managed by the artist himself. The technical details of prosthodontia are exacting in the extreme, and their execution sometimes may be entrusted to the laboratory man, if skillful, with better results than if attempted by the designer. Practice makes perfect in the construction details of this work just as certainly as in violin playing. The operator who does little of this work will find himself handicapped often when he attempts the construction of his own design.

The glaring deformities so frequently seen in the mouths of people are too often the result of incompetent work; not only in design, but in conception of what is artistic and in cheapness of execution. We have many times heard dentists boast of making a full lower and upper set of teeth on vulcanite in a day, and we presume that many do the same amount of work in less time. In

an emergency, such rapid work might be executed with fairly satisfactory results, but the selection and arranging of the teeth alone in most cases, cannot be done in less time, if the proper regard for cosmetic results is considered.

We know of a dentist spending two half days with his patient in taking the bite for an edentulous mouth; but when the teeth were finished, there was no question but that the time had been well spent, for the facial expression was ideally perfect; the occlusion was such that the masticating function was thoroughly restored; the plates fitted the jaw and were not dislodged by any irregular occlusal forces.

In our judgment, this kind of prosthodontia is worthy of as high rank as any operative or surgical treatment, no matter how skillfully it may be performed, because such operation will have been made in the most artistic and satisfactory manner. In other words, it is not the class of work that indicates the rank to be accorded any operation, but the manner in which it is accomplished, or the quality of effort put into it.

From such a consideration it must then be evident that there may be superior men practicing prosthodontia, while on the other hand, very inferior men may be specializing in oral surgery, or the other branches of the art of industry. Men may think they are successful practitioners of dentistry, because their fillings don't come out, who really are making very poor operations. It is not easy to determine one's standing in surgical operations, because nature repairs many bad scars. In prosthodontia, nature helps not at all; in truth, patients seem possessed by the evil one to make the dentist all the trouble possible.

The difficulties to be overcome in prosthodontia are greater than in any other department of practice; a higher grade of mechanical skill and scientific art are required here, than in any other branch. This may in a measure account for the dearth of good prosthodontists.

Many thoughtless people call themselves physicians and healers, and take unto themselves great credit for curing grievious sickness, when in fact they deserve no more credit for their efforts than the intelligent farmer who provides suitable conditions for the development of the seeds, which he plants, into the delicious fruit or fragrant and beautiful flowers. In this case, the healer

and the planter get nearer to the Creator and by this contact may partake of the glory of creation.

Can any one say that the mechanic who evolves out of his own educated mind a practicable substitute for a lost member of the most highly developed and complete organism in existence, has no right to attribute to himself an equal pleasure and assume a divine relationship?

To our mind the skilled prosthodontist deserves a greater rank than is generally accorded him, and we also believe that more genuine pleasure will accrue to the dentist who perfects this art and practices it on the highest plane of professionalism, than will come from his devotion to the simpler or less exacting branches of our calling.

If this be true, then we should call to this field the promising men in our colleges and encourage them to give this subject a very important part of their training.—*Dentist's Magazine.*

DIET DELUSIONS. If any individual prefers to restrict himself to a purely vegetable diet, including milk, butter, cheese, and eggs, he is perfectly at liberty to do so; but that he will gain any advantage whatever from his abstention from meat we are utterly unable to confirm. Whoever may be right, the extremist is absolutely sure to be wrong, and the pure vegetarian and the pure "animalian," if such an one exist, alike occupy positions which are in the eye of science, irrational and untenable. There is no valid or necessary ground, so far as we have been able to discover, for the exclusion of any known article of food, whether vegetable or animal, from our diet list in health.

No food can be mentioned, however indigestible or innutritious, which, in the proper time and place, and properly prepared, is not only permissible, but useful. Here as everywhere else wisdom is simply a sense of proportion. So far as we can judge from the structure of man's teeth and alimentary canal his diet in the past has unquestionably been a mixed one with a considerable leaning towards the carnivorous side. A close look as his large "eye" or cuspid teeth, his full set of incisors, and the clearly cusped edges of his molars, would indicate that animal food had played a large part in his diet in the past. He still shows his cuspid tooth

when angry, in the sneer, just like a dog or a gorilla. His stomach is barely distinguishable from that of a dog or great cat of somewhere near his weight, while it is separated by a thousand leagues of biological distance from the pouched and ballooned one of the pure herbivora. His intestinal canal is only about five times his body length, as in the pure carnivora, instead of from ten to twenty times as in the herbivora. If man is to become a pure and blameless vegetarian in the future, his stomach and alimentary canal will have to be reconstructed. These facts of structure are, of course, supported by all we know of the history of man and his immediate ancestors. Contrary to general impression and frequently published statement the anthropoid apes, while subsisting largely upon fruit, nuts, and roots, have a strong liking for animal food.

STUDY OF COUSINS IN CAPTIVITY.

At one time I had occasion to observe a number of these near cousins of ours in captivity, and was assured by the keepers, both in London, Berlin, Antwerp, and Hamburg, that they required considerable quantities of beef juice, milk, eggs, insects, or worms, and even small birds in order to be kept in healthy condition. In fact for years no great ape in captivity ever lived to anything like maturity, largely because they were fed exclusively on vegetable food. (Beddard.) The same is true of monkeys.

The New World monkeys simply will not live in captivity at all without considerable amounts of chopped meat and insects, eggs and freshly killed birds, and they have a very low death rate from tuberculosis. The Old World monkeys in cages side by side with them, in the same house, fed on precisely the same diet, with much smaller amounts of animal food, die at the rate of from thirty to forty per cent. per annum of tuberculosis. * * * *

UNWARRANTED HONOR PAID TO BROWN BREAD.

Then came a most powerful and unsolicited boost from the side of psuedo-science. It had long been noted that, from the earliest dawn of civilization, men exhibited a decided preference for the cleanest and whitest of bread that the combined efforts of millers and bakers could produce. No race ever yet ate black bread when it could get white; nor even brown, yellow, or other mulatto tint, until of recent years. A copy of some of Liebig's and Petten-

kofer's earliest analysis of food stuffs happened to fall into the hands of one Sylvester Graham, a dyspeptic New Englander and temperance reformer, about 1830. Finding that nitrogen and nitrogenenous substances were given a higher rank in the dietary than starches and other carbohydrates, and that white bread contained less nitrogen in proportion than brown, with the swift intuition of the child and the savage he leaped to the conclusion, bread being the principal staff of life and white bread containing a lower proportion of nitrogen than brown, that brown bread was the better food of the two. It was only a step further in that grammar of logic which has been the Bible of the true reformer since the world began, that whereas humanity suffers from many dyspepsias and other diseases of the digestive system, and lives chiefly upon bread, therefore bread must be the chief cause of these distressing conditions. He therefore inaugurated a campaign against white bread and in favor of brown, with which the world yet echoes.

GRAHAM'S DELUSION.

This view of his is the keystone of the chief triumphal arch of vegetarians, the discovery of a cheap, edible vegetable proteid; and as it rests upon an utter misconception of fact, we may as well consider it at once. Graham's delusion, of course, did not stop here, but finding that the coarser grains, oats, barley, rye, and corn contained large amounts of nitrogen, he proceeded to push these forward as superior to the wheat berry. Now, Nature is not a fool. Man, in so far as he is natural, attains to a considerable degree of instinctive wisdom. It is, to the biologist, a most significant fact that the unvarying and constant struggle of rising humanity, in the realm of diet, has been first towards the securing of meat and second towards the acquisition of white bread, and as much of it as possible. The fiercest wars have been waged for the possession of the broad, level, alluvial plains upon which wheat could be grown, and nobody but a mountaineer or a very far norther would eat either rye, barley, oats or maize, when he could possibly get wheat. And now comes science with a full and triumphant vindication of the rightness of humanity's instinct in this regard and a demonstration that white bread, and the whitest of the white, is the best, most healthful, and most nutritious food which the sun has ever yet grown from the soil. But our

cereophile says that white bread has less nitrogen than whole wheat meal, and whole wheat meal than rye or oatmeal. Perfectly true, and yet here comes the paradox, that this same whitest of white wheat flour contains per ounce more available nitrogen than any brown, barley, rye, or maize flour in existence. The secret of the error is a very simple one. It is not a question of the amount of nitrogen in a given food, but of the amount which is *available* for the body, in other words, *digestible* in its interior. While there is a larger amount of nitrogen in whole wheat flour than in white flour, *the whole of this excess is in form of branny husks*, which are as utterly indigestible in the food-tube as so much sawdust or cocoanut matting. It is precisely parallel with the "vegetable beefsteak" delusion of the mushroom faddist. Not ten years ago we were told that while we had been straining every nerve to secure unwholesome and indigestible pork, beef, and mutton, we had been overlooking the "meat" which grows at our very doors, the most delicate and nutritious food imaginable—mushrooms, "the poor man's beefsteak," as they were termed. The first examinations showed abundance of nitrogen to be present, but when this was submitted to the second test of how much was in form that could possibly be digested or made useful in the body, the bubble burst at once, for it was found to consist of compounds more nearly resembling dead leaves in their composition and nutritive value than anything else. As nitrogenous foods and flesh-formers the whole group of coarser cereals are far inferior in value to the plain, every-day white bread. Instead of white flour being deficient in nitrogen, it is precisely the opposite. Its very richness in digestible and soluble proteid (gluten) has given it its colossal rank among the world's food stuffs. This is what makes wheat bread the best single vegetable food yet discovered. Life and vigor cannot be sustained upon it so long or so well as upon meat alone, but it is far cheaper and hence more used. Potatoes, cassava, maize, sago, rice all contain abundance of starch and in a more soluble form, but are fatally deficient in digestible nitrogenous substance, or proteid. * * *

CEREAL FOODS ENORMOUSLY OVERRATED.

To sweep aside altogether these inflated statements, born evidently of the greed of the exploiter, it must be frankly recognized that the cereal foods are enormously overrated in point of nutritive

value. Their principal danger is the power of producing a feeling of fullness and satiety long before an adequate amount of nutrition has been taken into the stomach. Notwithstanding their virtues they are utterly inadequate to properly nourish the body by themselves. But someone will say at once: "Here are the tables taken from recognized authorities on dietetics and published in various Health and Food Journals, showing that the nutritive value of white flour, cornmeal, and graham flour is per pound and per ounce almost as great as that of meat or sugar and only below that of fat." The citation is perfectly correct, but the inference drawn therefrom is misleading. The substance as referred to in the table is the *dry* flour or meal, and as the mush or breakfast food as it appears upon the table consists of more than eighty per cent of water, the discrepancy is obvious. If anyone will simply step into the kitchen and watch the dish of oatmeal, cornmeal, or graham being prepared for the table, he will be astonished to see what a huge panful of thick mush a few tablespoonfuls of the dry product will make. As a matter of fact, a large bowl of mush, or other cereal is inferior in heating and building-up power to one small rasher of bacon, a single egg, or a piece of beefsteak half the size of one finger. The chief nutritive value of "mush-and-milk" resides in the milk (or cream) and sugar. Again instinct is justified, for no normal human could eat it without the bribe of either milk or sugar. Nobody but a Belgian hare would eat it "neat" of his own accord. To "taste good" is nature's stamp of approval upon a food.

You cannot get something for nothing, and one cent comes nearer buying one cent's worth of actual food value in the market the world over than we at one time believed. If you get a food which is lower in price than some other food, it is almost invariably found to be either lower in nutritive value, less digestible or less appetizing. We cannot support life on mushes, salads and fruit; it will injure our health in the long run if we try. My only advice to those addicted to the breakfast-food habit is, by all means take your anti-mortem serial, germicide, nearfood, or what not, at breakfast—but *be sure and eat your breakfast first.* Mush, like fruit, should come at the close of the meal instead of the beginning. To attempt to live upon it is a slow form of starvation. * * *

SUFFER BECAUSE WE HURRY.

The conviction is steadily growing in the profession that disturbances of digestion are due in eight cases out of ten, not so much to the food used, either in quantity, quality or method of cooking, as to the circumstances under which it is eaten—the disgraceful rush and hurry with which business or pleasure is resumed before the digestion has had time to get fairly under way, and the utter lack of adequate exercise in the open air to enable proper combustion of the food.

Further than that we are reacting decidedly from the exclusive and rigid diet for any diseased condition whatever, with the partial exception of diabetes. Even where these exclusive diets may relieve the symptoms which are designed specially to meet, such as obesity, glycosuria or gout, they are very apt to upset the general balance of nutrition and impair the vitality, frequently in the long run aggravating even the symptoms of the disease which they were prescribed to cure. A starch-free diet may clear a diabetic's urine of sugar and yet shorten his life, if he persist in it exclusively.—Dr. Woods Hutchinson, *McClure's.*

Clinical Digests.

AN EASILY CONSTRUCTED PORCELAIN CROWN FOR MOLARS.—By N. A. Stanley, D.M.D., New Bedford, Mass. In giving the different steps incident to the construction of this crown I do not claim anything new or original.

I first used it for broken-down molars in which an abscessed condition prevailed, which teeth, after being properly treated, made solid foundations for crowns. And if some few receive a suggestion that will help them over a difficulty the object of this clinic will have been attained.

Of course, the first step is to carefully treat and fill the roots, then fill the pulp chamber, restoring any decayed portion with amalgam. When nicely finished below the gum line there will be nothing to irritate the tissues, a thing essential in all crown work.

After the amalgam has hardened and has been trimmed, even with or a little below the gum line, proceed as follows: Drill two or three parallel holes wherever you can best put them, an eighth

of an inch or so in depth, large enough to take an 18-gauge platinum wire. Burnish a piece of platinum plate, 32 or 33 gauge, to this surface. The pressure of a small ball burnisher will indicate the position of the holes. Put the wire through plate and solder with pure gold.

I usually solder one at a time, as it assists in getting accurate relations.

The length of pins on the occlusal side will be determined by the closeness of the bite. After the pins are in position further burnishing and malleting will indicate the exact size of tooth on under side of platinum. Trim accurately to this line and bring to a knife edge. (Fig. 1.) Place in position and take impression

FIG. 1.

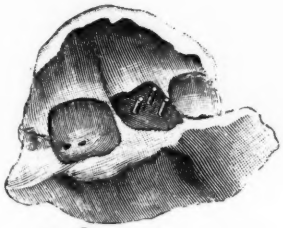


FIG. 2.

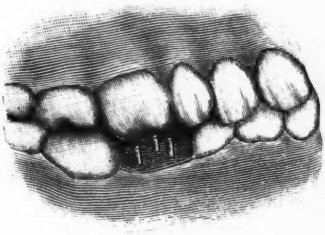


FIG. 3

FIG. 4.

and bite at the same time with plaster. (Fig. 2.) From this impression accurate working models are obtained. (Fig. 3.) A thin coating of wax on pins enables you to remove from model easily.

You are now ready to apply the body and biscuit it, and after it has been carved to more accurate proportions is ready to add the enamel, but before doing this it is well to wind a piece of small platinum wire around the ends of the pins (Fig. 4), as in baking the contraction of the body will cause these ends to spread.

Pure platinum should be used, so that the pins can be readily bent if necessary. But the little wire will prevent much change.

As there is considerable shrinkage it may be necessary to add

a little body or enamel several times before a perfect result is obtained.

My experience for crown work has been confined to high fusing body, whenever I have done my own carving.—*Items of Interest.*

PROCESS OF CONSTRUCTING A METAL DENTURE WITH SOLDERED TOOTH-ATTACHMENTS WITHOUT SUBJECTING THE TEETH TO THE FLAME. By Landis H. Wirt, D.D.S., Indianapolis, Ind. After having swaged the base and articulated it as for an ordinary metal denture, select the teeth, using any of the detachable-pin crowns. (Fig. 1.) For the molars use the pinless vulcanite teeth.

Swage for each tooth a base of thin gold, and solder a pin as shown in Fig. 2. Place these on the teeth, fastening them with a film of wax; then adjust the teeth with wax on the cast in the

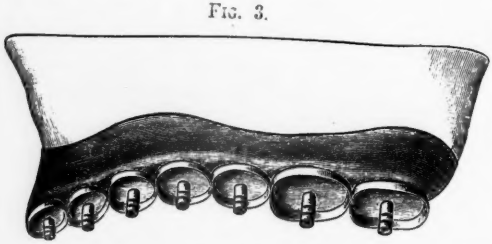


FIG. 3.

FIG. 1

FIG. 2

articulator, as they are to be in the completed case. Remove the teeth by warming slightly with a hot instrument, being careful not to disturb the arrangement of the bases. (Fig. 3.)

Next remove the plate from the cast in the articulator, and invest it in a mixture containing asbestos fiber, to prevent any change in the shape of the metallic base. Let the investment fill the palatal surface of the case, and leave ample thickness over the rims and pin bases. After it has set, remove by means of hot water the wax from between the ridge of the plate and the pin bases, after which flux and flow solder into this space.

When the soldering is finished, the buccal and labial surfaces may be veneered with pink rubber vulcanized thereon. When the whole is polished, the teeth may be secured in place with a good

crown and bridge cement, in the same manner as they would be cemented to natural roots in the mouth.

This makes not only a substantial and artistic denture, but likewise gives a natural appearance to the lingual aspect of the plate which cannot be obtained with any other kind of teeth.

These crowns may be used on ordinary vulcanite cases by cutting a slight groove mesio-distally across their bases with a thin stone, thus allowing a little extra rubber to flow into the holes, which in the case of a metallic base are intended for the posts.—*Dental Cosmos.*

SOME IDEAS I HAVE FOUND TO BE A HELP IN PRACTICE. By Dr. W. H. Spaulding, Bedford, O. In soldering up a crown or bridge, I find a common lead pencil a fine tool for teasing the solder to flow just where I want it. I prepare pencil for the work as follows: Sharpen pencil as for ordinary use, only making a longer slant to the point. I then cut the wood back, exposing lead for about one-half inch from the point. I then saturate the wood for about an inch up the shaft of pencil with diluted sulphuric acid. Then wrap lower part of shaft with strip of asbestos paper down to exposure of the lead and bind with wire thread. This helps to resist action of the heat from blowpipe. It makes a light, cool and satisfactory tool that does the work much better than platinum, and it does not drag the solder as an overheated platinum point is apt to do.

TO REPAIR A MASON BRIDGE WHEN FACING HAS BROKEN OUT AND YOU DISLIKE TO REMOVE ENTIRE BRIDGE FROM MOUTH.

Proceed as follows: Select a Steele facing suitable for case as to size and shade. Then remove the platinum bar (which will usually remain in backing), and file a groove on either side of the bar that was baked in the facing until the bar will slide up and down easily in groove in the back of the Steele facing you intend to use. Adjust facing to backing with bar in place by taking a little off of facing at gingival or incisal, as case demands. When adjustment is satisfactory cement to place, as usual. In case the cap at top of backing which keeps facing from pushing up into gum is torn off, file or cut a slot in lower end of dovetail groove of backing. Then solder a small piece of platinum on

lower end of the dovetail bar with pure gold. File down to form a lug that will fit in slot you have made in backing. When facing and bar are in place grind from under side to a smooth surface and polish.

TO POLISH A PORCELAIN CROWN OR ANY PORCELAIN TOOTH THAT HAS BEEN GROUND TO CHANGE SHAPE.

Proceed as follows: Make a very soft paste of a saturated solution of spirits turpentine, gum camphor and pumice flour. Keep your polishing wheel wet with this mixture while repolishing the tooth. You will be pleased with the result.—*Dental Summary.*

FIXED SPLINT FOR RETAINING LOOSENED TEETH. By Dr. E. A. Vaughan, Denver, Colo. Many appliances have been devised for the retention of loosened incisor teeth. The one which I describe has been used by me in nearly fifty cases, and has given my patients comfort and unqualified satisfaction. The same principle has also been applied in a number of cases as an attachment for small bridges, in places where bands and crowns would have been unsightly and uncomfortable, with equal success.

The requisites for the work are a set of Bryant's bridge repair instruments, consisting of screw dies, nut driver, cone-shaped burs for the direct hand piece, conical gold nuts, iridio-platinum wire, 23 gauge, 31 gauge pure gold plate, and straight drills a little larger than the iridio-platinum wire.

The first step is to ligate the loose teeth, holding them as firmly as possible, and in their natural position.

With any sharp instrument drill holes, just above the pulp chamber, through the loosened and adjoining firm teeth on either side. Usually this includes the four incisors and the two cuspids. These holes must be parallel with each other, or there will be great difficulty in inserting the finished piece. With the cone bur countersink these holes on the labial side to nearly their full depth.

Into the center of a square piece of pure gold plate, a little larger than the tooth, solder a piece of the wire. Put in position on the back of the tooth, with the wire passing through the hole, and lightly burnish to the surface. Remove and trim exactly to the shape of the tooth. Cut threads on the wire, return to position, screw the nut down firmly and burnish the gold thoroughly

to place. Repeat this process on each tooth until all are backed and the backings held firmly by the nuts.

Cut away the front of a partial impression tray, and with plaster take impression of the lingual surfaces of the teeth with backings in place. Unscrew the nuts, remove backings and place them in impression. Run model with investing material. I use Sump. Separate and solder the assembled parts together.

In inserting the piece, apply the rubber dam from second bicuspid to second bicuspid. Cement each tooth separately, beginning with the firm teeth, springing the appliance back and working the cement down between the backing and the tooth, and also into the drilled holes. Screw the conical nut down tightly into the soft cement, dress down flush with the tooth surface and polish.

Appliances of this kind which have been in place for three years are doing good work, show no signs of deterioration, and I find the gums even when receded nearly to the apices of the roots firm and healthy, and in most cases pyorrhea has completely disappeared.—*Items of Interest.*

A METHOD OF FILLING A WIDELY-OPEN APEX. By Mr. Walter J. May, M.R.C.S., L.R.C.P., L.D.S. Having at times experienced considerable difficulty in filling a root canal in which there is a large apical foramen, I venture to bring to your notice a method which I have found of considerable service, and which some of you may not have practiced. The open apex may result from incomplete formation or from intentional perforation. I do not wish to convey the impression that I advocate perforation of the apex of a root in any but the most exceptional cases, or for you to think that I adopt the method in routine practice. I would ask you to picture a central incisor with a widely perforated apex, a chronic abscess and a sinous opening on the gum. Having thoroughly cleansed the canal, and, if necessary, forced creosote or other disinfectant through the sinus, one is at times quite unable to get the end of the canal dry, all one's dressings get sodden at once and themselves act as irritants, preventing healing. Even when one succeeds in getting rid of all pus there is a continual weeping of sanguineous fluid through the apex.

In these cases it is practically impossible to insert a gutta-percha filling with certainty, but with the method I am about to

describe one can feel certain of placing a clean, solid plug in the apical foramen.

The method is as follows: I first enlarge the foramen with a Morey drill to insure a clean, round hole, and to accurately gauge the size. Then with a stiff-hooked Donaldson measure the exact length of canal. Next, with a Morey one size larger than the first one, drill to within about one-sixteenth inch apex, leaving a shoulder.

Now take a piece of wire, preferably platinum, the exact size of larger Morey, and reduce the terminal one-sixteenth inch to the exact size of the smaller Morey. Pass the wire up the canal until it is felt to be tightly held by the shouldered apex.

Withdraw wire and cut off sufficient to form apex plug. Now cleanse the root as well as possible and force the plug into position. The little metal plug will present a surgically clear surface to the periosteum and the remainder of the canal may be readily dried and sealed with gutta-percha.

In order to lessen the slight difficulty of getting plug up the root canal, a small pin may be soldered to the under surface of plug and a carrier made as shown. This pin serves to hold the plug on a carrier consisting of a piece of wire with a hole in the end. It will further serve to hold the plug to the gutta-percha, if in after years absorption takes place.

The method, perhaps, seems rather a lengthy one, but is really a time-saver, for, having perforated the apex with the smaller Morey to get the size, the patient may be dismissed whilst the larger Morey and wire of same size are being made ready; all the trouble of getting a dry apex being done away with.

Another advantage is that the wire may be allowed to remain in the canal on trial before cutting off the plug. It should not, however, remain long, as the unfilled crevices around wire will certainly become septic.—*British Journal of Dental Science.*

PRACTICAL HINTS. By E. T. Loeffler, D.D.S., Ann Arbor, Mich., Professor of Dental Therapeutics, Dental Department, University of Michigan. Immediate root-filling should not be resorted to in case the pulp is removed by pressure anesthesia. Two to five days should be allowed for a restoration of the equilibrium of the circulation in the surrounding tissues, especially the peridental

membrane. An antiseptic dressing in the root canal will take care of any secondary hemorrhage or serum that may come in through the apical foramen. In case the canal is filled immediately, the secondary hemorrhage, due to the reaction, causes an undue pressure in the apical space, and is likely to set up an active inflammation or congestion of the peridental membrane, and further, if septic conditions are present, will lead to general inflammation. About 30 per cent of the cases treated by this method in our clinics show symptoms of hyperemia, in spite of the fact that we follow out the above rule. It is our candid opinion that many teeth are either lost or cause blind abscesses when the above instructions are not rigidly adhered to. When pressure anesthesia of any sort is resorted to in the removal of pulps every possible antiseptic precaution should be taken to avoid forcing septic matter into the apical space.

A VERY EFFICIENT METHOD FOR ANESTHETIZING THE PULP WITHOUT THE USE OF THE PRESSURE SYRINGE.

Prepare the cavity in the usual way. Place a pledget of cotton saturated with cocaine solution directly over the pulp and fill the remainder of the cavity with a piece of vulcanite rubber. Then take a short piece of orange wood, fit it into the cavity as prepared, and direct the patient to bite down upon the wood with increasing force. In this way we can obtain a well-directed, regulated force or pressure, and with less discomfort both to the patient and the operator.

In our daily clinics we have succeeded in anesthetizing pulps by this method, after repeated attempts by other means have failed.—*Dental Summary.*

A CASE OF HEMOPHILIA. By Thomas L. Gilmer, M.D., D.D.S., Chicago. Patient, Swedish man, age twenty-eight. Physically, condition apparently fairly good. No heart lesion. Had always bled excessively from trivial injuries, though had had but one serious hemorrhage prior to the last, which followed a surgical operation which I did for removal of cyst from upper jaw. The one preceding the last, about two months previous, was a spontaneous hemorrhage from the nose, lasting about twenty-nine hours. Was controlled by packing and internal medication. The nature of the treatment, other than packing, unknown.

Patient had a large cyst in upper jaw lying above the upper bicuspids and first and second molars. The cyst had caused absorption of the bone in the locality to such an extent as to expose the roots of the teeth above mentioned, and had elevated the wall composing the floor of the maxillary sinus, practically obliterating the antrum. At eleven a. m., the patient was anesthetized with ether and the teeth indicated removed and the cyst sack dissected out. The hemorrhage was somewhat excessive. After irrigation the wound was packed tightly with iodoform gauze. There was a slight oozing from the margins of the wound which continued until five-thirty p. m., when the hemorrhage increased; removed packing, irrigated with hot water, and repacked. Hemorrhage ceased. Was called to the hospital at nine-thirty p. m.; found that the hemorrhage had commenced again soon after the last packing and had steadily increased. Removed packing and washed out clots; repacked tightly and placed a compress over same and closed lower teeth on it and securely bandaged the mandible so as to hold the compress tightly in place. The hemorrhage ceased. The compress was removed on the second day, when the hemorrhage commenced again; repacked and applied compress again; hemorrhage ceased. Third day compress left off in forenoon. Put patient on calcium chloride, ten grains every two hours, and tincture chlorid of iron, fifteen drops every four hours. Packed wound with gauze and tanic acid; hemorrhage ceased. Fourth day very slight hemorrhage, patient nauseated, objected to iodoform, changed to boric gauze, wound did not granulate. Fifth day nausea increased, left off calcium chlorid, continuing iron every four hours; less nausea. Patient looked quite anemic, but little hemorrhage. On night of sixth day was called at ten p. m.; found the patient bleeding freely, quite nervous, quick, small pulse, very nauseated. No sign of granulations in wound; irrigated wound and packed with gauze on which ferro pyrene had been freely dusted; discontinued internal medication; hemorrhage ceased at once. Seventh day, pulse nearly normal, patient less nervous, no nausea, appetite, which had been poor, was good, less anemic, granulations springing up over all parts of the wound. Repacked with gauze, omitting ferro pyrene. No more hemorrhage and recovery uneventful. The temperature was a trifle above normal the second day following the operation, after which, until the

hemorrhage was controlled, it was slightly subnormal. I did not apply the adrenalin, as in a previous case of hemophilia I found it of no value whatever locally applied. In the case just referred to I was able to control the hemorrhage by applying tannic acid on a compress with the tincture chlorid of iron internally. Ferro pyrene has none of the escharotic or other objectionable qualities of Monsel's salt of iron and in this case it was much more effective, leaving a healthy granulating wound instead of raw surface usually following applications of subsulphate of iron.—*Dental Brief.*

THE SHADING OF PORCELAIN TO MATCH THE TOOTH SUBSTANCE BY THE HELP OF THE PYROMETER. By Weston A. Price, Cleveland, O. The method consists in part of baking a separate button of the mix used for the inlay at the same time as the bake in the matrices. This is stripped from the platinum and compared to the tooth and the mix modified connecting the shade before adding more to the inlay. This is repeated with each addition if the eye can see the possibility of improving the shade. The results are very definite, since the pyrometer makes it possible to bake each time to an exact temperature, and hence an exact shade.—*Dental Summary.*

METHOD OF CONSTRUCTING ARTICULATED GOLD CROWN. By Dr. E. M. Martindale, Columbus, O. Prepare tooth carefully for band, and fit contoured band as accurately as possible. Place band on tooth and have patient bite into modeling compound, thus getting an impression of the teeth, relatively articulated. Pour up impression and mount on articulator. Varnish or oil opposing teeth, place soft plaster on banded stub, close articulator, and when plaster is set trim off excess plaster, exposing edge of band all the way around.

Carve cusp, articulating it in every required movement. Press carved cusp into moldine far enough to outline the edge of band, make die and counter-die of fusible metal. When cusp is swaged the band line will be indicated on gold, carefully trim to this line, solder to band and the finishing will be quickly and easily done. Crowns for molars and bicuspids thus constructed will be a satisfaction to both patient and operator.—*Dental Summary.*

REMOVABLE PORCELAIN BRIDGE. By Harris R. C. Wilson, Cleveland, O. Clinic consists of a metal skeleton, also a completed removable porcelain bridge for the upper left cuspid, lateral and central incisors; two attachments and dummy lateral incisor.

Roots are prepared with cap of 22-k. gold and sealed tubes of 32-g. iridio-platinum. Bridge consists of two split pins with floors to fit above cap and 14-g. square wire of iridio-platinum to form a support; all being soldered with pure gold. Facings are ground and soldered to frame and the lingual contour built up with porcelain to give natural feeling to tongue.

Advantages are:

May be removed to clean.

May be removed to repair.

Will not insulate the tissues.

Does not show any metal.

Feels like teeth, while bridges with self-cleansing spaces are not natural to the tongue.—*Dental Summary.*

A NEW FORM OF RETAINING APPLIANCE. By W. H. Williamson (Aberdeen), M.D. and M.C.Aberd., L.D.S. Edin. There is often a great deal of difficulty in making regulating or retaining appliances which are not objectionable from an esthetic point of view. A case in point is that of a girl, aged fourteen, in whom a very prominent right lateral incisor had been brought into line, and two instanding centrals pushed out. The teeth distally of the cuspids were very closely interlocked, and no space available for the passage of wires in connection with a palatal anchorage, hence it was desirable to confine the retaining fixture to the front teeth. First of all, bands of German silver were put on the two centrals with projections resting on the labial surfaces of the laterals, and although these were effective, the dark appearance was very noticeable, not to say disagreeable, when the patient smiled. To obviate this, platinum bands about thirty-five gauge were made for the two central incisors, soldered together, and small flattened wires attached at the distal borders to rest on the labial surfaces of the laterals. The whole labial surface of the band was roughened with a graver, and a thin layer of porcelain put on, fired to the full biscuit stage and then

the appliance was forced to place on the teeth in the mouth. It was then taken off, and a coating of porcelain approximating the color of the teeth was fully fused over the first layer. Put on with cement in the usual way, using no undue force, the appliance served its purpose extremely well, and reduced unsightliness to its lowest limit.

The same principle was used in a case of overlapping incisors, in which case, after separation, the left central had been rotated, using a band on the tooth with a little hook on the mesio-labial surface, and a rubber band passing from it round the distal of the tooth, and attached to an expansion arch. This quickly effected the purpose, and the retainer consisted of a platinum band on the rotated central, with a short wire attached lingually and resting on the lingual surface of the right central. The band was faced as already described. It would seem, therefore, advisable, in cases in which bands are used in the front of the mouth for regulating purposes, and where they are also desirable for retaining, that platinum should be used in the first instance, instead of German silver or gold, so that there would be no occasion for a second band, but merely that the original one be covered with porcelain, and used as a retainer or as part of one.—*British Dental Journal.*

CAVITIES IN WHICH THE USE OF PORCELAIN IS CONTRAINDICATED AND CAVITIES IN WHICH IT MAY BE ADVANTAGEOUSLY USED.—On account of the brittleness of porcelain, I would not advise its use in molar teeth when the margins of the cavities are exposed to the stress of mastication; nor would I advise its use in bicuspids when the margins are so exposed. If I wanted to use this material in a bicuspid or molar, I would so prepare the cavity that the margin of the inlay would be carried beyond the area of susceptibility, for in most of the cases presented for restoration, the tooth is disintegrated to such an extent that it becomes necessary to protect the frail walls by grinding away the cusps and replacing them with the filling; especially is this true of the bicuspids. However dangerous this practice may seem, some of the most satisfactory inlays we have made are in bicuspids, when, after one to four years' service, the margins are still perfect, and the teeth apparently in as high a state of preservation as when the restoration was made. For cavities in the six anterior teeth we find porcelain more strongly indicated than for those in the posterior teeth, and indeed in the former, if we care anything for the esthetic effect of our operation, we are forced to use porcelain; consequently our attention is more strongly centered in these teeth.

The Dental Digest.

PUBLISHED THE LAST WEEK OF EVERY MONTH

At 2231 Prairie Avenue, Chicago,

Where All Communications Should be Addressed.

Editorial.

THE DUTIES OF STATE BOARDS OF EXAMINERS.

Along with the state laws passed in the last few years for the regulation of the practice of the various professions, laws intended to protect the people from the abuses of the unscrupulous and the quacks, come numerous complaints against state boards, not alone against state boards of dental examiners, but against other state boards as well.

One of the most recent cases which has come to our notice is that against the State Board of Pharmacy of the state of Maryland. It seems that a chemist made application for a license to practice as a drug clerk in Baltimore, and the Board of Pharmacy refused to grant an examination on the ground that the applicant was not a graduate of a school of pharmacy. The applicant, believing he was entitled to an examination, took the matter into the courts, and as a result secured at the hands of the Supreme Court of the United States a ruling to the effect that it is not within the province of a state board appointed by the governor, to inquire either *how*, *when* or *where* a person has attained proficiency to practice his calling, but rather to inquire *has* he acquired such proficiency, and, further, that it is the duty of the board to give every applicant a chance to demonstrate his fitness.

This ruling of the Supreme Court is of interest to the dental profession, for what applies to the Board of Pharmacy of the state of Maryland will apply to all state boards of all states, and, we take it, that it will therefore be necessary to amend many of the laws, which, as they now exist, are really inoperative and unconstitutional.

In many states the state boards of dental examiners recognize a diploma issued by a reputable school of dentistry as the neces-

sary qualification either for the issuance of a license to practice or for the privilege of taking an examination, but according to this recent decision we believe it will devolve upon the state boards to go further and give an examination to any applicant, whether or not he be the holder of a diploma, and find out regarding his ability to properly serve those entrusted to his care.

Not infrequently is heard complaint from some applicant for a license that he has not received just and proper treatment at the hands of the state board of dental examiners. It is claimed, and we have seen in print intimations coming from some members of state boards, that it is the duty of the state boards of dental examiners to protect the dental profession from overcrowding, but such a holding is plainly illegal and not well founded, and what must be done in Maryland must be done in other states.

It would seem at the present time, notwithstanding the vast improvement made in the last few years, both in the dental laws and in the personnel of the boards of examiners, that there is yet much improvement and change to be made. Whether or not the faults lie in the laws, in the boards, or in both, is an open question. The real duty of a state board of dental examiners is, according to our idea, to protect the people from abuse and injury at the hands of the incompetent.

Some change can be brought about by the National Association of Dental Faculties, made up of representatives of the recognized schools. Their rules governing requirements, graduation, etc., are uniform, and let them do away with the rule that says a student *must* be in attendance three or four years and substitute a more just rule that will allow a student to take an examination for advanced standing and go ahead if he be qualified and has the skill. One student may be able to do in one year what another will do in two years, and it is manifestly unfair for the diligent and talented of a class to be held back by those slothful and stupid. If a student can, after two years' schooling, acquire the necessary knowledge and skill to practice his profession, he should not be compelled to spend another year in school.

It would be absurd in this day and age to take the position that it is not of *very great* advantage for a student to enter one of the well-equipped dental schools to get his training, but if he sees fit to get his training outside the dental school, according to

the ruling of the court, he is entitled to an examination and credentials if he can show that he is qualified.

As the National Association of Dental Examiners is to meet in the near future in Atlanta, Ga., the time seems ripe for a discussion of these questions, that they may come up for consideration and adjustment. Though under the court ruling, state boards cannot raise a question as to schooling or credentials, the boards will be the most important factors in the professions. The responsibility of the boards will be increased and it is important that they get together and, as far as possible, unify not only the laws and rules, but examinations as well, so that a man who has obtained a license in any state may be allowed to practice in any other state.

When such a condition obtains, friction and strife will be banished and equity and justice established.

Notices.

NORTHERN OHIO DENTAL ASSOCIATION.

The Northern Ohio Dental Association held its annual meeting at Cleveland, June 5, 1906, and the following officers were elected: President, J. R. Owens, Cleveland; Vice-president, C. A. Allen, Toledo; Corresponding Secretary, D. H. Ziegler, Cleveland, re-elected; Recording Secretary, J. K. Douglas, Sandusky, re-elected.

COLORADO STATE DENTAL ASSOCIATION.

The twentieth anniversary meeting of the association was held in Denver, at the Brown Palace Hotel, on June 19, 20 and 21, 1906. Colorado Springs was chosen as the next meeting place.

The newly elected officers are as follows: President, J. Allen Smith, Colorado Springs; Vice-president, G. A. Dille, Denver; Secretary, B. Frank Gray, Colorado Springs; Treasurer, Wm. Smedly, Denver.

GEORGIA STATE DENTAL SOCIETY.

At the annual meeting of the Georgia State Dental Society, held at Savannah, June 19, 20 and 21, 1906, the following officers were elected: President, William Crenshaw, Atlanta; First Vice-president, T. C. Gibson, Forsyth; Second Vice-president, C. B. Davis, Americus; Corresponding Secretary, D. H. McNeill, Atlanta; Recording Secretary, D. L. Hill, Atlanta; Treasurer, H. R. Jewett, Atlanta. Executive Committee, W. M. Zirkle, Atlanta.

MISSISSIPPI STATE DENTAL ASSOCIATION.

The Mississippi State Dental Association held its annual meeting at Gulfport, June 6, 7 and 8, 1906, and the following officers were elected: President, L. B. McLaurin, Natchez; First Vice-president, L. A. Smith, Port Gibson; Second Vice-president, J. H. Phillips, Meridian; Secretary, E. Douglas Hood, Tupelo; Corresponding Secretary, W. H. Reaben, McComb City; Treasurer, C. C. Crowder, Kosciusko.

LOUISIANA STATE DENTAL SOCIETY.

The annual meeting of the Louisiana State Dental Society was brought to a close June 3, 1906, at New Orleans. The following officers were elected for the ensuing year: President, F. A. Blanchard, Marksville; First Vice-president, W. J. Tenney, St. Tammany; Second Vice-president, H. P. Magruder, New Orleans; Recording Secretary, E. J. Zeidler, New Orleans; Corresponding Secretary, A. L. Plough; Treasurer, Charles Mermillod, Sr.

SOUTHWEST VIRGINIA DENTAL SOCIETY.

At the annual meeting of the Southwest Virginia Dental Society, which was held at Bluefield, June 1 and 2, 1906, the following officers were elected: President, W. P. Nye, Radford; Vice-presidents, T. W. Crozier, Christiansburg, and F. L. Black, Bluefield; Secretary and Treasurer, L. E. Ward, Pocahontas; Chairman of Executive Committee, J. V. Haller, Witheville; Members of Executive Committee, W. S. Gregory, Roanoke, and F. M. Ehret, Blacksburg.

SOUTH DAKOTA STATE DENTAL SOCIETY.

At the twenty-first annual meeting of the South Dakota State Dental Society, held at Vermillion, June 12, 13 and 14, 1906, the following officers were elected for the ensuing year: President, E. W. O'Neill, Canton; Vice-president, M. D. Donahue, Sioux Falls; Secretary, Ferdinand Brown, Sioux Falls; Treasurer, J. W. Smoots, Beresford; Librarian, C. W. Stutenroth, Watertown; Candidates for the State Board, G. W. Collins, Vermillion, and E. H. Wilson, Miller.

KENTUCKY STATE DENTAL ASSOCIATION.

At the annual meeting of the Kentucky State Dental Association, held at Louisville, June 12, 13 and 14, 1906, the following officers were elected: President, Max M. Eble, Louisville; Vice-president, McFerran Crow, Versailles; Secretary, W. N. Randall, Louisville; Treasurer, H. K. Kellog, Louisville. Board of Trustees, Fred R. Wilder, Louisville; J. W. Blackburn, Bowling Green; I. H. Harrington, Louisville. State Board of Dental Examiners, Charles R. Shackell, Louisville; H. S. Heverin, Louisville. Board of Censors, J. B. Thompson, I. P. Long and R. E. Grant, all of Louisville.

IOWA STATE DENTAL ASSOCIATION.

At the meeting held by the Inlay Society of the Iowa State Dental Association at Waterloo on July 31 the following officers were elected: President, C. W. Bruner, Waterloo; Vice-President, J. E. Rose, Vinton; Secretary and Treasurer, L. F. Kellogg, Marshalltown.

ST. LOUIS DENTAL SOCIETY.

The St. Louis Dental Society (the oldest dental society in continuous existence) is contemplating the celebration of its fiftieth anniversary during the month of November. A special committee is at work on the programme and hope to have it ready for the September journals.

MASSACHUSETTS STATE DENTAL SOCIETY.

At the forty-second annual meeting of the Massachusetts State Dental Society, held at Boston, June 6, 1906, the following officers were elected: President, M. C. Smith, Lynn; First Vice-president, George E. Savage, Worcester; Second Vice-president, N. A. Stanley, New Bedford; Secretary, Charles W. Rodgers, Dorchester; Treasurer, Joseph T. Paul, Boston; Editor, Carl R. Lindstrom, Lynn.

MINNESOTA STATE DENTAL ASSOCIATION.

The Minnesota State Dental Association held its twenty-third annual meeting June 11, 12 and 13, 1906, at Minneapolis, and elected the following officers for the coming year: President, R. W. Berthel, St. Paul; Vice-president, A. C. Rosencranz, St. Peter; Secretary, F. E. Cobb, Minneapolis; Treasurer, H. M. Reid, Minneapolis. Dr. Holden of Duluth was elected as the Chairman of the State Board of Dental Examiners.

TEXAS STATE DENTAL ASSOCIATION.

The twenty-sixth annual session of the Texas State Dental Association was held at Galveston, June 14, 15 and 16, 1906, and the following officers were elected: President, R. D. Griffis, Paris; First Vice-president, A. A. Dyer, Galveston; Second Vice-president, Charles H. Edge, Houston; Secretary and Treasurer, G. Waller Staples, Dallas; Curator, A. F. Sonntag, Waco. Executive Committee—Chairman, C. J. Smith, Austin; C. L. Watson, Mexia; J. W. Combs, New Braunfels.

MISSOURI STATE DENTAL ASSOCIATION.

The Missouri State Dental Association held its forty-first annual meeting at Springfield, June 5, 6 and 7, 1906. The following officers were elected: President, F. G. Worthley, Kansas City; Vice-presidents, J. W. Hull, Kansas City, and J. B. McBride, Springfield; Recording Secretary, H. H. Sullivan, Kansas City; Corresponding Secretary, E. P. Dameron, St. Louis; Treasurer, J. T. Fry, Moberly.

The forty-second annual meeting will be held in Kansas City.

NORTHERN IOWA DENTAL SOCIETY.

The Northern Iowa Dental Society will meet in Cedar Rapids, Ia., September 11, 12 and 13, 1906.

C. N. Booth, *Secretary*,
Cedar Rapids, Ia.

WISCONSIN STATE DENTAL SOCIETY.

At the meeting of the Wisconsin State Dental Society held at Madison, Wis., on July 18 and 19 the following officers were elected: President, Dr. W. H. Codworth, Milwaukee; Vice-President. Dr. W. H. Mueller, Madison; Secretary, Dr. Harvey N. Jackson, Milwaukee; Treasurer, Dr. Adolph Gropper, Milwaukee. The next meeting will be held at La Crosse.

NORTHERN INDIANA DENTAL SOCIETY.

The eighteenth annual meeting of the Northern Indiana Dental Society will be held in Hammond, Ind., on September 18 and 19, 1906.

Arrangements are being made to make this the greatest convention ever held in Northern Indiana. Already some of the best talent in the country has been secured.

Samuel A. Bell, *Secretary*.
Hammond Building, Hammond, Ind.

AMERICAN DENTAL SOCIETY OF EUROPE.

At the annual meeting of the American Dental Society of Europe, held in Berlin, August 4, the following officers were elected for the coming year: President, H. C. Merrill, Cologne; Vice-President, A. H. Chamberlain, Rome; Secretary, John W. Sale, Cologne; Treasurer, William Cooper, Frankfort. The next place of meeting is Rome in 1907.

BOSTON AND TUFTS DENTAL ALUMNI ASSOCIATION.

At the last meeting of the Boston and Tufts Dental Alumni Association, held June 19, 1906, the following officers were elected: President, George T. Baker; First Vice-president, William Rice; Second Vice-president, Ervin A. Johnson; Corresponding Secretary, Marion L. Woodward; Recording Secretary, R. W. Cram; Treasurer, N. A. DeWitt; Editor, James R. Piper. Retiring President Irving J. Wetherbee was made chairman of the executive committee, and the other members of that committee were re-

NORTHEASTERN DENTAL ASSOCIATION.

The twelfth annual meeting of the Northeastern Dental Association will be held in Horticultural Hall, Boston, Mass., October 17, 18 and 19, 1906. This meeting, held in Boston, can and will be made a great success. The talent for both essays and clinics is of a high order and plenty of it. The exhibits also promise to be elaborate and interesting. Please remember the dates. An invitation is extended to all ethical members of the profession to attend.

Thomas J. Barrett, *President*.
Edgar O. Kinsman, *Secretary*.

NEW JERSEY STATE DENTAL SOCIETY.

At the meeting held by the New Jersey State Dental Society at Asbury Park, July 18, 19 and 20, the following officers were elected: President, H. R. Brickman, Hackensack; Vice-President, Walter Woolsey, Elizabeth; Secretary, Charles A. Meeker, Newark; Assistant Secretary, H. S. Sathpen, Newark; Treasurer, Henry A. Hull, New Brunswick; Chairman Executive Committee, W. A. Jaquett, Salem.

MICHIGAN STATE DENTAL ASSOCIATION.

The semi-centennial convention of the Michigan State Dental Association was held at Detroit, Mich., July 9, 10 and 11, 1906. The following officers were elected for the ensuing year: President, A. L. LeGro, Three Rivers; Vice-President, E. B. Spalding, Detroit; Secretary, L. M. Hogarth, Detroit; Treasurer, J. Ward House, Grand Rapids; George Zederbaum, Charlotte, to fill vacancy on the board of trustees. L. N. HOGARTH, *Secretary.*

VIRGINIA STATE DENTAL ASSOCIATION.

At the meeting of the Virginia State Dental Association held at Old Point, Va., August 8 and 9, the following officers were elected for the ensuing year: President, Dr. Edward Eggleston, Richmond; First Vice-President, Dr. F. A. Lee, Lynchburg; Second Vice-President, Dr. J. T. Stiff, Richmond; Recording Secretary, Dr. G. F. Keesee, Richmond; Corresponding Secretary, Dr. J. Hall Moore, Richmond; Assistant Corresponding Secretary, Dr. W. M. Pearson, Hampton; Treasurer, Dr. W. S. Ewald, Portsmouth. The next place of meeting is at the Jamestown Exposition.

MAINE DENTAL SOCIETY.

The forty-first annual meeting of the Maine Dental Society was held at Kineo, July 17, 18 and 19, and the following officers were elected: President, George E. Dow, Portland; Secretary, Henry A. Kelley, Portland; Treasurer, E. J. Roberts, Augusta; Librarian, Elbridge Bacon, Bar Mills; Chairman Executive Committee, R. W. Bickford, Rockland. The next meeting will be held at Eastport or Campobello, and efforts will be made to make this a combined meeting of the Maine and New Brunswick Dental Societies.

REDUCED RAILROAD RATES TO ATLANTA.

A round trip rate of one fare, plus 25 cents, has been secured in all territory south of the Potomac and Ohio and east of the Mississippi.

In all other territory the rate of one and one-third fare on the certificate plan has been granted. Delegates will pay full fare going to Atlanta, taking a receipt therefore, which will entitle a return at one-third rate. Tickets will be on sale accommodating those who attend the Facul-

ties' and Examiners' Association as well as the National Dental Association, and the return trip date from Atlanta is September 25.

The Ocean Steamship Company will on September 11 sell tickets at one rate plus $5 round trip from New York, and one fare plus $6 from Boston.

J. D. PATTERSON, *Chairman Executive Committee,*
National Dental Association.

RECENT PATENTS OF INTEREST TO DENTISTS.

821,150. Dental swaging apparatus, Frank L. Argall, San Jose, Cal.
821,192. Set of artificial teeth, Carl Rauhe, Dusseldorf, Germany.
822,582. Attachment for natural teeth and forming the same, John P. Carmichael, Milwaukee, Wis.
823,150. Dental handpiece, Charles L. Alexander, Charlotte, N. C.
823,167. Dental disk shield, Wm. F. Green, Modesto, Cal.
38,079. Design, dental cabinet, Wm. G. Hullhorst, Toledo, Ohio.

News Summary.

THOMAS S. RYDER, a dentist of Manhattan, N. Y., died June 25.

HOMER CUNYUS, a dentist of Crockett, Tex., died of consumption, July 6.

HENRY WESTON, 70 years old, a dentist of Philadelphia, Pa., died July 11.

EDWARD P. STARBUCK, 70 years old, a dentist of Waltham, Mass., died July 4.

ALPHONSO M. DAY, 44 years old, a dentist of Boston, Mass., died July 19, 1906.

JOSEPH E. ZIPF, 39 years old, a dentist of Joliet, Ill., died of consumption, July 8.

L. H. EAGER, a young dentist of Hindman, Ky., died of typhoid fever, Aug. 8, 1906.

E. R. STEADMAN, a dentist of East St. Louis, Ill., committed suicide Aug. 2, 1906.

SAMUEL B. CRAWFORD, a dentist of Chicago, Ill., died of heart disease, Aug. 8, 1906.

GEORGE CHESTER, 36 years old, a dentist of Elkhart, Ind., died of consumption, July 12.

GEORGE B. SALTER, 68 years old, a dentist of Chicago, Ill., died suddenly of apoplexy, June 30.

PEARL L. ELLIS, formerly a dentist of Swanton, Vt., died at Bethel, Vt., of tuberculosis, July 19, 1906.

ALBERT FICKESSEN, 52 years old, a dentist of New Orleans, La., died of strychnine poisoning, June 25.

De Witt Clinton Franklin, 71 years old, formerly a dentist of Los Angeles, Cal., died at Findlay, O., July 17, 1906.

Joseph Coy, 40 years old, formerly a dentist of Dayton, O., died as the result of hemorrhages and blood poisoning following the extraction of two teeth, June 27.

Fires.—Philadelphia Dental Company, Spokane, Wash., July 18; loss unknown.—N. L. Swayzee, Yazoo City, Miss., July 28; loss $4,500, insurance $2,800.—Dr. Swick, Dayton, Ore., Aug. 3; loss $3,500.—C. D. Owens, Benton Harbor, Mich., automobile and garage destroyed.

Fatality.—At the end of June a youth, 16 years of age, who was employed by an Eastbourne, England, dentist, fixed the gas administering apparatus to his own face and died of asphyxiation.

Fatalities.—July 27 a woman died at Boone, Ia., whilst under chloroform and immediately after the extraction of ten teeth.—July 30 an elderly woman died at Myerstown, Pa., as a result of a dental operation of a week previous, when she had had eight teeth extracted.—Aug. 4 a young woman committed suicide at Chicago, Ill., owing to the agonies which followed the smashing of a tooth during a clumsy dental operation.

Assaults.—July 14 a dentist of Newark, N. J., was assaulted by a youth, who was arrested and committed to jail in default of $300 bail.—July 25 a dentist of Morristown, Pa., was arrested for having smashed a pitcher over another man's head. It seems that the men occupied adjoining apartments, and the injured man had complained to the doctor about obnoxious odors emanating from a gas apparatus, and after a heated argument the assault was committed. The dentist furnished $500 for a further hearing.—July 26 a dentist of Ethel, Mo, was stabbed in the abdomen by a 15-year-old boy, who was arrested and afterward released on a $1,000 bond.—Aug. 7 a dentist of Tennessee took part in a drunken quarrel with another man, which eventually terminated by the men seriously wounding each other by stabbing.—Aug. 10 two dentists of Detroit, Mich., came to blows in the public streets, which resulted in their arrest, and eventually both being let off on suspended sentence.

Accidents.—July 16 as S. H. Sanborn, a dentist of Woburn, Mass., was working in his laboratory his vulcanizer exploded and he was fortunate enough to escape with but slight injuries.—Aug. 8 M. A. Duffy, a dentist of Scranton, Pa., was conspicuous in a work of rescue from drowning on Lake Winola, when one man was saved and another drowned.—Aug. 11 Thomas M. Daniels, a dentist of Worcester, Mass., was thrown from his conveyance and received injuries which necessitated his removal to hospital, owing to the horse having shied at a passing car.—June 28 A. J. Wildanger, a dentist of Flint, Mich., was suddenly stricken with blindness, which is believed to be only of a temporary character.—July 9 Oliver Colburn, an aged dentist of Big Rapids, Mich., was seriously injured by the explosion of a vulcanizer which blew every window out of his house. Eight stitches were necessary to close a wound in his face.

ACCUSED OF DESERTION.—A dentist of Chicago was arrested recently at Detroit, Mich., on the charge of having abandoned his wife and taken from her $1,600 of her own money, thus leaving her penniless.

BREACH OF PROMISE.—A New York dentist was recently sued by a young lady of Chicago for breach of promise, the lady claiming $25,000 damages as a balm for her broken affections. After the evidence had been heard the case was dismissed.

A DUSKY SAFE.—The young sultan of Johore, India, possesses one great peculiarity. Many years ago an accident with a horse resulted in the loss of nearly all his teeth. These were replaced by teeth of solid gold, in each of which a large diamond was placed.

INSANITY RESULTS FROM THE USE OF COCAIN.—A dentist of Chatsworth, Ill., has become demented through the use of cocain. It is claimed he became addicted to the use of the drug while caring for a friend whom he sought to keep from the excessive use of intoxicating liquors.

INSIDE INFORMATION.—The story is not a new one of the man who came to a doctor in real distress and wanted relief "immajately." When asked the cause of his trouble he said:

"Oi've swallowed me false tathe, an' they kape bitin' me iv'ry sthep Oi tek!"

TOOTH STAINING AS A VOCATION.—The trade of tooth stainer, followed in eastern Asia, is as odd a calling as any. The natives prefer black teeth to the whiter kind, and the tooth stainer, with a little box of brushes and coloring matter, calls on his customers and stains their teeth. The process is not unlike that of blacking a boot, for a fine polish is given to the teeth. The pigment is harmless.

TEETH INSURANCE.—It has been reported in the press that a dentist has evolved a plan for the insurance of teeth whereby any person holding a policy might have his grinders insured, so that when requiring attention, the cost of the work will be greatly lessened. The fact that he had to abandon practice in his town and seek new fields may possibly be accounted for by his endeavoring to follow the precepts of his plan.

TO FURTHER AID THE SAN FRANCISCO SUFFERERS.—The Metropolitan District Dental Society of Boston has appointed a committee to further work in seeking and receiving contributions in aid of the suffering dentists of California. The following men compose the committee: Drs. John F. Dowsley, Boston, chairman; L. D. Shepard, Boston; P. R. Andrews, Cambridge; George E. Mitchell, Haverhill, and Charles C. Patton.

The committee telegraphed $1,000 to Dr. Van Orden at San Francisco on June 15th and a shipment of instruments, etc., was forwarded during the same week. The national committee elected to supervise the work of collection of money, material and instruments for the needy professional men consists of Drs. V. E. Turner, Raleigh, N. C.; G. V. Black, Chicago; James Truman, Philadelphia, and J. D. Patterson, Kansas City.

HICCOUGHS.—In obstinate hiccoughs try 20 grains of quinin at a dose; you will be pleased with the results.—WHERRELL, *Med. Arena* (*Dentist's Magazine*).

TO APPLY TOPICAL REMEDIES.—In applying topical remedies to sensitive cavities care should be taken to have them heated sufficiently to prevent any shock or pain.—W. G. E., *Dentist's Magazine.*

HARMONY.—We have laws of harmony in music, laws of harmony in colors, as in painting; laws of harmony in lines, as in drawing, architecture, designing and ornamenting. And so we have laws of harmony that govern the architecture of man, and especially his face and teeth.—F. H. BERRY, *Dentist's Magazine.*

TIGHTENING SCREW CONNECTIONS.—For tightening screw connections, dissolve powdered shellac in 10 per cent ammonia and paint the mass over the screw heads after they have been thoroughly cleaned; then screw the fitting home. The joint will be impervious to hot or cold water.—*Popular Mechanics* (*Dentist's Magazine*).

PROTECTIVE FOR PORCELAIN DURING SOLDERING.—When circumstances make it necessary to nearby soldering to invest crown or bridges porcelain-face up, cover the porcelain with thin asbestos paper saturated with the investment mixture, catching the free ends in the body of the investment proper. The paper protects throughout the operation from the direct action of the flame.—*D. O. & L.*

FREE DENTISTRY IN GERMANY.—False teeth will not be in demand in Germany if the free care of children's teeth continues to grow in popularity. Strasburg started the movement in 1902, and Darmstadt, Muhlhausen and other cities have followed suit. The third annual report from Strasburg says that there were 12,691 visits to the clinic last year and that the children are improving in the care they give their teeth.

HONOR TO WHOM HONOR IS DUE.—The Odontographic Society of Chicago gave a banquet on May 15 in honor of Dr. L. P. Haskell, it being the occasion of his eightieth birthday. Dr. Haskell has practiced dentistry for fifty-six years and is generally well known by the profession throughout the country. He has written several text-books on subjects of interest to the profession, and is everywhere recognized as an authority on all matters relating to dental prosthesis.

METHOD OF MAKING CLASPS.—Take a piece of platinum-gold wire about No. 17 gauge, and with pliers bend like a hairpin, and then press the wire together from where the bend is first made until contact is secured for about 5-16 of an inch. Unite with solder. Now with the pliers bend to fit the tooth, carrying one end of the wire down to be embedded in the wax over the ridge and the other to be bent so as to be embedded in the opposite direction. Hammer out the two ends until they are slightly flattened, and roughen each arm of the wire with a file so the clasp will be firmly held in the vulcanite.—*Items of Interest.*

TRULY APPETIZING.—A woman living in the country had for some time been buying her butter of a woman living not far distant. The butter was delivered by the maker's little girl, Mary. The butter was always sent in neat, little half-pound pats, prettily ornamented. One day the lady said to the little girl:

"Mary, how does your mother ornament her butter so prettily? She must have some new kind of butter print."

"No, ma'am," said the little girl. "She does it with her false teeth."

ILLEGAL PRACTITIONERS.—July 18 a dentist of Brooklyn, N. Y., was put on his trial for illegally practicing dentistry, and was found not guilty. He maintained that the prosecution was the work of personal enemies.—July 26 a young woman was arrested at Brighton, Mass., and charged with practicing dentistry without a certificate.—Aug. 2 a man of Sioux Falls, S. D., was arrested and charged with illegally practicing dentistry. He was fined $25 and had to pay costs.—Aug. 7 information was filed against a man at Joliet, Ill., for illegally practicing dentistry. It seems that he has previously had similar trouble, but nothing of a legal character has been decided, there being a doubt as to whether a certificate he claims to possess was issued according to law.—July 13 a man at Montreal, Canada, was fined $25 and costs for practicing dentistry without a license.

DAMAGE SUITS.—About July 16 a dentist's assistant sued his employer, a dentist of Hopedale, Ill., for wages and received judgment for $150.—July 18 a dentist of Chicago, Ill., had returned to him a fine that had been imposed upon him last November, when he was charged with "mashing." The police having discovered the error of justice, the magistrate returned the fine and tendered a written apology.—July 21 a dentist of Valley, Neb., sued a farmer for $140 for professional services and supplies and obtained judgment for $75.—July 31 the administrator of a murdered dentist of Secor, Ill., filed suit against the Chicago and Alton Railroad Company, asking for $10,000 damages for the death of the deceased, who was shot by a drunken fellow passenger.—Early in August a prominent New York dentist filed a suit for $2,100 for professional services against an equally prominent lady of Worcester, Mass. There are thirty-six items in the bill filed with the plaintiff's declaration.—July 7 a woman obtained $2,400 compensation from a dental company of Los Angeles. It appears that an assistant, upon drawing the seventh tooth, permitted it to slip from the forceps, and the patient drew it into her right lung.

DIVORCES.—July 2 Gustavus S. Junkerman, head of the Cincinnati Dental College, was sued for divorce, cruelty being alleged.—July 3 Fred F. Reinert, a dentist of Perry, Ia., was sued for divorce, failure to maintain his wife being alleged.—July 9 Dr. McKim, a dentist of Hannibal, Ill., disappeared from his usual quarters, and it is conjectured that his figuring as a prospective corespondent has something to do with his departure.—July 18 the wife of Clyde Caldwell, a dentist of Chicago, Ill., asked for a divorce on the grounds that her husband denied her proper financial support.—July 23 the wife of John V. Ducey, a dentist of Goldfield, Nev., brought suit

against her husband, alleging extreme cruelty, asked for $100 attorney's fees, $30 for court costs, and $35 monthly temporary alimony.—July 20 the wife of Alison Judson Parker, a dentist of Chicago, Ill., instituted divorce proceedings, alleging her husband's affections had been transferred to another woman.—July 25 the wife of John A. Whipple, a dentist of Chicago, Ill., petitioned for divorce upon the grounds that she went in fear of her life, besides other charges.

MARRIAGES.—Walter I. Boynton, a dentist of Springfield, Mass., was married to Miss Mabel Gertrude Carley of Manchester, N. H., Aug. 8.—Melville M. Everett, a dentist of Atkinson, Ill., was married to Miss Maude N. Reynolds of Geneseo, Ill., July 25.—M. W. Havel, a dentist of Montgomery, Minn., was married to Miss Antoinette Thaler of Calmar, Ia., July 18.—O. E. Hill, a dentist of Alliance, O., was married to Miss Euba Hess of Fairmount, Va., July 27.—J. B. Hoare, a dentist of Northville, Mich., was married to Miss Rose Dickerson of Northville, Mich., during the middle of July.—John B. Lyke, a dentist of Sheboygan, Wis., was married to Miss Helen Krebs of Sacramento, Cal., Aug. 2.—R. Weston Webb, a dentist of Hartland, Me., was married to Miss Iona M. Willis, formerly of Pittsfield, Me., Aug. 8.—George W. Allen, a dentist of Hartford, Conn., was married to Miss Eva Broder of Hartford, Conn., July 7.—A. E. Bronson, a dentist of Lewis, Ia., was married to Miss Pattison of Waterloo, Ia., June 19.—Isaac Burton, a dentist of Colorado Springs, Colo., was remarried to Miss Marie Emma Williams, July 3.—Dr. Chamberlin, a dentist of Parkersburg, Ia., was married to Miss Florence Jackson of Aledo, Ill., June 20.—Gideon Charles Ellis, a dentist of Bellevue, Ia., was married to Miss Louise Swigart of Maquoketa, Ia., June 27.—W. Griffin, a dentist of Macomb, Ill., was married to Miss Edyth Cabeen of Aledo, Ill., June 27.—E. E. Hawley, a dentist of Golden City, Mo., was married to Mrs. Eva Hazen of Dudonville, June 25.—J. F. Heintz, a dentist of Green Bay, Wis., was married to Miss Delia Dittmer of Seymour, Wis., June 30.—A. T. Hummel, a dentist of Byersville, Ia., was married to Miss Othilla Ament of Dyersville, Ia., June 26.—William S. Lyon, a dentist of Meriden, Conn., was married to Miss Adeline A. Mix of New York City, June 30.—Howard A. Manning, a dentist of Worcester, Mass., was married to Miss Leola E. Pettigrew of Worcester, Mass., June 27.—Maseef Melaik, a dentist of Eureka, Ill., was married to Miss Clella Lang of Kewanee, Ill., June 26.—Thomas William Ross, a dentist of St. Louis, Mo., was married to Miss Lilias Boyles of Warrensburg, Mo., June 28.—Mitchell B. Yeoman, a dentist of Lansing, Ia., was married to Miss Nora Coppersmith of Dorchester, Ia., June 28.

TOO STRENUOUS.—Green—I'll never patronize that fashionable dentist again. He has a double pull.

Brown—Why, how is that?

Green—After pulling my tooth he proceeded to pull my leg.—*Columbus Dispatch.*

MILLION IN TEETH.—On the authority of the greatest manufacturer of dental supplies in England, there are over 40,000 ounces of pure gold worked up annually for dentists' use for material in filling teeth in plates and solders, the value of the gold approximating $1,000,000.

ROBBERIES.—J. L. Piper, Lynn, Mass., about June 14; $15.—Drs. Butler and Roberts, La Harpe, about June 17; $100.—W. T. Sullivan, Kaukauna, Wis., June 23; $200.—W. L. Conkey, Appleton, Wis., June 22; $50.—Amos Adsit, Appleton, Wis., June 25; $25.—J. A. Brown, Boston, Mass., June ..; $15; the thief, a young negro, was caught and fined $15.—O. C. Moon and L. E. Blair, Beaver Dam, Wis., June 26; $25 and $10, respectively.—Fred Staves, Des Moines, Ia., June 25; $15.—William H. Morris, Manitowoc, Wis., June 17; $20.—F. G. Hunt, Denver, Colo., June 24; $50.—Drs. Jackson and Brubaker, and the Boston Dental parlors, Denver, Colo., June 25; $150 and $65, respectively.—J. S. McGowan, Winton, Va., June 29; $25.—Drs. Irwin and Bagley, and W. F. Brown and H. D. Barr, Anniston, Ala., July 1; the former two lost $200 and the latter two suffered but slightly.—Drs. Moore, Nichols and Ball, O'Toole, and Wilson, Ann Arbor, Mich., June 30; $40, $13, $12, and $15, respectively.—G. C. Nixon, Youngstown, O., about July 4; $20 but the thief left plunder behind of greater value.—H. E. Gunn, Warren, O., July 7; $100.—F. E. Renkenberger, Dr. Beatty, J. K. Nash, and Dr. Hineman, Youngstown, O., about July 7; various quantities of gold.—J. B. Vedder, Akron, O., early in July; $10.—Dr. Mott, Wells, Minn., July 7; $40.—Paul Barney and C. P. Peterson, Mankato, Minn., July 11; $60 and $10, respectively.—Walter S. Quin and Matthem H. Laity, both of New Haven, Conn., July 17; gold, silver, etc.—J. D. Alvord and Edward B. Griffith, both of Bridgeport, Conn., July 17; gold and platinum.—S. K. Rice, Northwood, Ia., July 25; $115.—Paul Barney and C. P. Peterson, both of Mankato, Minn., July 17; $50 and $10, respectively.—July 23 a young man was arrested for having stolen fifteen sets of artificial teeth from a dentist's case in Brooklyn, N. Y.—George C. Fahy, New Haven, Conn., July 23; although nothing was stolen, every professional accessory was damaged.—Dr. Adams, Chicago, Ill., July 25; $4.65 worth of gold. A professional employe, a victim to morphine, was arrested and sent to prison for 60 days, he not possessing the $15 necessary to meet the fine.—July 25 a man was arrested at Richmond, Va., for using unjust scales when purchasing gold from dentists. He was liberated upon his lawyer's bond for $100, and eventually disappearing the legal gentleman forfeited his money.—Robert Wallis, Champaign, Ill., July 27; $25.—A. E. Mann, E. B. Brokaw and G. B. Lowery, all of Findlay, O., about July 30; respectively, $5, $32, and $12; Dr. Zopfi, also of same city, had an overcoat stolen.—F. W. Ruhl, Dr. Camnan, and J. E. Fowler, all of Wapakoneta, O., July 30, combined total of $200.—L. M. Coodearle, Stoughton, Wis., July 30; $125.—Milton Riddell, Brazil, Ind., July 30; $25.—Herbert Patterson, Makanda, Ill., early in August was the victim of a hold-up, when he had $17 taken.—A young South Bend, Ind., dentist, who was married Aug. 5, is being sought for by the police on a charge of embezzlement.

PREVENTING CARIES.—As soon as possible after the teeth back of the cuspids have erupted, dry them carefully and swab them with a solution of nitrate of silver, working it into the sulci and any defective structure that would invite caries. After a minute or so wipe off the teeth. I have used this method of preventing caries with success for the past ten years. It will be necessary to watch the teeth carefully, and should any indication of caries appear repeat the treatment.—H. L. HAMILTON, in *International.*

TOO MUCH RUBBER.—With a good model and good undercuts it frequently happens that the plate does not stick. In 90 per cent of the cases it is because too much pressure is used in closing the flask, making irregular compression of the model. To prevent this use the cloth (wet) that comes on the sheets of rubber, and open the flask two or three times, removing excess from waste gates. The last time when the flask has come together remove the cloth. Try this plan and note results.—G. G. BROWN, in *Western Journal.*

STERILIZING THE MOUTH.—Dr. H. C. Register says that he has a number of patients who visit him every ten days for treatment of the mouth. He uses a germicidal wash that is colored, so that it will stain any mucoid deposits on the teeth. He uses it as a spray, with high pressure of condensed air, and blows it in between the teeth and into alveolar pockets. If any of the teeth are not cleaned by it, the coloring material will indicate the places where hand polishing with abrasives should be used to completely free the teeth from any deposit that is likely to set up caries, or to serve as a focus of infection.—*Brief.*

CORRECT BITE.—To get a properly related bite of an edentulous mouth, make the base plate as usual and add the wax for contour and occlusal effects. At the back part of the upper trial plate and on the lingual surface build on a clutch, or semicircular ring of wax that will admit the end of the tongue. Place the bite plates in the mouth and tell the patient to close his lips and place his tongue in the clutch on the upper plate and then bring his jaws together, biting on the back teeth. The position of the tongue will center the occlusion, and the closure of the lips prevent protruding the lower jaw.—R. KESSEL, in *Items.*

AN EFFECTIVE LIGATURE.—In cases where the clamp is objectionable for the retention of the rubber dam, and where the ordinary floss is not sufficiently bulky to prevent the rubber from drawing over it, a most admirable method of using the ligature is to first pass the floss through two pieces of rubber tubing, allowing one piece on the buccal and one on the lingual side of the tooth. This is much preferable to stringing beads on the ligature or using other agents, as already suggested. The tubing should be the smallest size sold at the rubber stores, the kind used for slipping over the bows of glasses where they rest on the ears. To insure against leakage, drop a little sandarac varnish between the tubing and the enamel on the buccal and lingual sides.—E. M. S. FERNANDEZ, in *Review.*

SETTING A DAVIS CROWN PIN.—Prepare the crown and pin in the usual manner; fill the socket to the crown with powdered sulphur; pass the crown through an alcohol flame until the powder liquifies; insert the pin and hold it in place until cool.

RETENTION OF DENTURES.—If possible two roots should be left in each jaw and utilized to support the plate. A satisfactory method is to fit each such root with a gold cap and tube, into which fit a pin attached to the plate. The stability which even one root so treated will give to an entire denture is surprising.—WM. M. GABRIEL, *Dental Record.*

HE KNEW.—"Did you never," asked Miss Solefool earnestly; "did you never meet a person whose very presence filled you with unutterable feelings—whose lightest touch seemed to thrill every fiber in your being?"

"Oh, yes," responded Mr. Oldbatch; "you mean the dentist."—*Cleveland Leader.*

ROOT TREATMENT.—When next you need to get a liquid medicament to the end of a root canal try this method: Flood the canal with the liquid, introduce a twist or spiral broach and revolve it the wrong way; the blades of the broach will operate like the screw propeller on a steamboat. It's "all right."—*Office and Laboratory.*

THE GOLD MATRIX: PROTECTION FROM FUSING.—It is not necessary that any matrix be invested; when gold is used it is protected from fusing by coating it, preferably with rouge, because of its great fineness and affinity for a smooth surface. The rouge is bought in powder and spatulated with alcohol and water. It will resist heat to an astonishing degree.—W. A. CAPON, *Items of Interest.*

DENTAL CARIES AND OSTEOCLASTS.—Drs. Coyne and Cuvalie, of the Pathological Laboratory of Bordeaux, France, in their examination of microscopical specimens of carious teeth, think they have detected in the zones of decalcifying dentin multinuclear cells resembling osteoclasts. They divide the affected region into four layers. The zone of destruction, the zone of decalcification, the opaque zone and the transparent zone. In the first two they claim to have plainly detected the osteoclasts, which they believe participate in the tooth disintegration.—*Cosmos.*

PRACTICAL.—If there be one species of cant more detestable than another, it is that which eulogizes what is called the practical man as contradistinguished from the scientific. If by "practical man" is meant one who, having his mind well stored with scientific and general information, has his knowledge chastened and his theoretic temerity subdued by varied experience, nothing can be better; but if, as is commonly meant by the phrase, a practical man means one whose knowledge is only derived from habit, or traditional system, such a man has no resource to meet unusual circumstances. Such a man has no plasticity; he kills a man according to rule, and consoles himself, like Molier's doctor, by the reflection that a dead man is only a dead man, but a deviation from received practice is an injury to the whole profession.—WM. R. GROVE, *Cosmos.*

THE POINT OF VIEW.—"All the women seem to think him a good humorist."

"Not all the women; only those with pretty teeth."—*Philadelphia Ledger.*

INLAYING A GOLD FILLING.—Burnish a piece of No. 30 or 60 goldfoil into the cavity and cement it to place. Then fill the cavity with gold in the usual way. This insures marginal contact and adhesion, consequently a watertight filling.—*British Journal Dent. Science* (*Register*).

AN ACT WELL WORTHY OF IMITATION.—The Milton, Pa., dentists have taken a step in a charitable direction and are to be commended for such action. By agreement among themselves, and requesting no compensation, they are taking care of the teeth of the school children whose parents are not in a position to pay for dental work. Working alternately, they give one day a month to this task. The children are recommended by their teachers.

INVESTING BRIDGEWORK.—The investment should be trimmed down until no surplus beyond the actual requirements remains, and until all the wax is exposed. This in turn facilitates the free exposure of the metal parts and diminishes the degree of heat required to solder.

The wax should be carefully removed with a small, sharp-pointed instrument, and any overhanging edges of the investment then trimmed away until the metal surfaces of both "abutment pieces" and dummies are freely exposed. Strength in the investment should be obtained from the under side in order to admit of this, and thus facilitate and expedite the process of heating up and soldering.—HART J. GOSLEE, in *Items of Interest.*

VALUE OF DENTISTRY.—Without the aid of skillful dentistry, humanity could not have health and attain longevity. We are, therefore, as practitioners of a branch of the healing art, important factors, and cannot be dispensed with. My humble opinion is that in the sphere in which we operate, we are quite as necessary as is the physician and surgeon, for it takes the combined skill of the three professions to keep the human body in a fair state of health. Our remedy, then, lies in the appreciation of this fact, and a fee commensurate with service rendered should be considered in every case we treat, every case we operate upon and every denture we supply.—W. H. CHILSON, in *Review.*

TO REPAIR BRIDGE.—To repair a bridge in the mouth from which a tooth has broken, drill two small holes to fit pins, grind pins flush, place modeling compound over the tooth to hold in and to protect the lip, hold a spoon on under side, also for protection, touch pins with chlorid of zinc for flux and soft solder as follows: Prepare a copper soldering instrument like the Evans root drier, only with the point about one inch long and larger—you can make one in fifteen minutes out of a half-inch copper rod—dip point in chlorid of zinc and take up a small piece of common soft solder and touch pins; you can solder it in one second and it is there to stay. Try it before you laugh, and see how easy it is.—H. F. DICKASON, Lampasas, Texas, *Practical Dent. Jour.*

Good and Bad Subjects for Nitrous Oxid.—All weakly and sickly persons are splendid gas subjects, as they do not possess much toleration or resisting power. Neurotics are usually bad actors. Many of them pass into a peaceful, quiet sleep and recover instantly when the work begins. Others of the same class will laugh, cry or sing, frequently shout at the topmost voice, usually accompanied with defensive or offensive movement of the body and limbs. Do not attempt to anesthetize an old toper unless you are a rich man and want experience.—Dr. A. D. Kyner, Moweaqua, Ill., *Dental Review.*

A Case in Practice.—A child was brought to my office with the request that I extract the two lower second and right first bicuspids. These teeth were erupting inside the arch by more than half their width. The parents wanted them extracted, because they annoyed the child. I persuaded them to wait until the teeth were fully erupted, so they could be more easily grasped with the forceps. By the time I saw them again they had so nearly moved out to the normal position that by tongue pressure and the use of a spoonhandle they were soon brought to their proper anatomical position. I mention this incident to show that a somewhat specious plea was necessary to put off the extracting till nature had done the work which rendered extraction unnecessary. The teeth were about ten months behind the normal time of eruption.—H. M. Walker, in *Western Journal.*

Removal of Foreign Bodies from the Esophagus.—A patient recently came to my office complaining of having swallowed a fish bone between three and four hours previously. It had lodged in the esophagus, just below the larynx, and caused considerable mental and physical pain. A probang not being at hand, I was at a loss to know what to do, until I recalled a statement once made by Dr. Gile, professor of the practice of medicine in the Dartmouth Medical College, when lecturing on diseases of the intestinal tract. He said that a snarl of thread swallowed and the withdrawal was very effectual in removing foreign bodies from the esophagus. I acted upon this suggestion, using ordinary grocer's twine for the snarl, and a fish bone an inch in length was successfully removed. —R. J. Ward, M.D., *American Medicine* (*Dental Register*).

Starting Gold Fillings with Cement.—Using a quantity not too large of a cement setting with moderate quickness, there is a ready and positive fixation of the first pieces of gold. There is no rocking or tipping. The pulp when nearly exposed is protected, weak walls are strengthened, gold is prevented from showing through thin walls, and with skilled manipulation positive anchorage is obtained in cavities in which it would be extremely difficult to pac kor retain the gold in any other way. To my mind, the putting of metal fillings, and especially amalgam fillings, in cavities without these linings may be compared, with a little exaggeration, to building a wall of loose bricks; while the combination of the metal and tooth surfaces with the plastic cement layer between is like the wall of brick solidly laid in a good quality of mortar. The difference in stability and permanence is an extreme difference.—C. A. Brackett, in *Dental Brief.*

TOOTHBRUSH CAMPAIGN AMONG SCHOOL CHILDREN.—A movement is on foot for a toothbrush campaign among New York City school children. As a result it may be that dental examiners will be assigned to the schools the same as medical examiners are now employed. There can be no question concerning the value of such a plan. By dental attendance upon the children there is no doubt but that the health of the pupils would be much improved. If New York inaugurates the plan with success it will not be long before many other cities throughout the country will be following the example.—*Summary.*

COLD WATER FOR RESINED IMPRESSIONS.—Some dentists coat plaster impressions with a solution of soap, to facilitate the parting of it from the cast; others use a varnish made of one of the resins dissolved in alcohol. To make impression and cast part company readily it is customary to throw both, while still in apposition, into water, preferably cold, except in those cases in which soap or other non-resinous agent has been used as a separating medium. If thrown into hot water, the heat, penetrating to the resin-coated surface of the impression, effects adhesion, with the result that one has two surfaces cemented each to the other, that part with difficulty and mutually roughen each other, leaving the surface of the cast pitted and scaled in some places and with bits of the impression adhering in others. The safe plan is to soak the pair of mixes for a few minutes in cold water when a resinous parting fluid is used; in hot or cold when the medium is non-resinous. As stated above, there is a quicker result when hot water is used, the heat playing an important part in tearing the pieces from each other.—*D. O. & L.*

TO PREVENT ALLOYING OF CROWNS BY FUSIBLE METAL.—First, never use it. It so happens, however, that many prefer this method of shaping shells, and to get rid of the metal throw shell and its low-melting contents into a basin of boiling waer, the basin still over the flame; or, worse, they heat the shell in the flame itself. In the first instance the shell is in contact with the bottom of the basin, and for the time becomes a part of that utensil; as a consequence it drinks in a small quantity of the fusible-metal die, and notwithstanding its treatment later to a bath in acid it is alloyed to some degree and for all time. In the second instance, no matter how skillful the workman, some "dross" clings to the inner surface of the crown; its perfect removal is next to impossible. The effect of this maltreatment shows in the melting down of the alloyed part during annealing or reinforcing with solder; or, if it escape this fatality, in the "greening" of the crown, when subjected to the action of the secretions, especially of some mouths. The greenish gold crowns, originally twenty-two karat, have all been colored in this way. If one must use fusible metal forms, and especially of a melting point but little below the temperature of boiling water, contact with the basin may be prevented by covering the bottom with a thickness or two of blotting paper, or with a layer or two of cloth In every case the shell should be thrown into acid and kept there until all traces of the baser metals have been removed.—*D. O. & L.*

BUBBLES IN PORCELAIN.—I believe the reason I do not have bubbles is that in mixing the body I spatulate with a great deal of force, mix and incorporate it thoroughly, grinding it down with a strong spatula, and when it comes to settling the body, settling it vigorously in one direction. So many when they have a crown or inlay upon a vise, or otherwise, will settle the body in one direction, then they will turn it over and unsettle it again, and rasp it up, change the original settling of that body until—why shouldn't there be bubbles?—J. D. PATTERSON, *Western Dental Journal.*

CARVING WAX FOR CROWN AND BRIDGE WORK AND OTHER USES.—Take pink base-plate guttapercha, one sheet, and one sheet of pink paraffin and wax, the same as that used for waxing base plates. Melt the wax with dry heat and then put the guttapercha in and stir until the latter is melted, then pour out onto a plate and let cool. The common beeswax makes just as good a product, only the color is liter. Be sure and use dry heat for *this.* Keep at a high temperature all the time; if it takes fire blow it out. The best vessel I find for melting it is a granite dipper with a long handle, stirring with a steel spatula until the guttapercha is melted. This material is to take the place of modeling compound and plaster in crown, bridge and gold inlay work. It carves nicely and smoothly without chipping or flaking. If you trim off a little too much, just warm a shaving and stick it on with a warm knife-blade; burnish it down. The blade for carving with should be warmed just a little to make it cut smoothly.—C. B. POWELL, *Dental Brief.*

CONTOURING A BRIDGE.—Some two years ago a young lady of about twenty years called at my office to consult regarding the advisability of having a bridge. She had lost the incisors, and there had been an unusual amount of absorption. The absorption was to such an extent as to render it impossible to insert a bridge in the usual manner, having the teeth ground up to come in contact with the gum and still admit of the proper restoration of the contour of the lip. I used as abutments bandless Richmonds on the cuspids, made in the ordinary manner, and arranged the incisors in such a manner as to restore the contour and give the most pleasing effect, and in so doing the cervical end of the incisors did not come in contact with the gum, but stood away nearly one-fourth of an inch; now I burnished platinum foil over the cervical ends of the teeth and over the anterior portion of the cast back of the teeth, allowing it to extend up as high on the cast as necessary to enable me to build a sufficient amount of porcelain on the platinum that when baked it would properly restore the contour and expression of the lip. This porcelain gum was a detached piece, that when finished would fit the cervical ends of the incisors, and is kept in position by the weight of the lip, causing no inconvenience to the patient whatever and enabling me to restore the expression in a very much more satisfactory manner than I would have been able to have done with a stationary bridge in any other way.—K. P. ASULEY, in *Western Journal.*

To Young Men.—Upon you more than any other class in the profession depends the future status of our profession. Let each one of you realize that upon your individual influence depends your own success and elevation or degradation of your profession. Young men, start right, keep right, and you will end right.—J. R. Mitchell, *Dominion Dental Journal.*

A Simple Protector for the Hot-air Syringe.—The metal portion or end of the syringe may be covered with a piece of white rubber tubing of the same diameter; the tubing to be about an inch shorter than the metal end. When in use, the tubing is to be drawn up on the metal toward the bulb, exposing the tip for heating, after which the tubing is pushed out, so as to cover the point, thus confining the heat, and, being a non-conductor, effectually preventing the burning of the lips or mucous tissue. —*Dental Brief.*

Treatment for Gum Before Setting Crown.—When the gum has been wounded in grinding the root or in reducing the band to root-level, the acid of the cement works into the wound and gives rise to discomfort similar to that following the application of salt or vinegar. This, of course, subsides as the cement sets, but is anything but pleasant while it lasts. To overcome the pain thus inadvertently induced and to head off such as may attend the setting of the crown, I dry the root and adjoining gum and paint them with chloropercha. The effect is immediate and the discomfort hardly worthy of mention.—J. C. Edington, *Dental Office and Laboratory.*

Hydrogen-Dioxid, and Blind Abscesses.—The criticisms that have been published on peroxid of hydrogen amount almost to its condemnation as a practical agent in connection with dentistry.

I wish to enter my protest to these extreme views; it is an exceedingly valuable agent, and I know of nothing that could take its place for certain purposes. All that is needed, it seems to me, is a little word of caution as to its forcible injection into any sac or cavity with insufficient vent. For exampie, if there is doubt as to the connection between the root canal of a tooth and an apparent sinus or fistula, the fact of such connection should be established by the injection first of simple warm water, or water containing but a small per cent of the H_2O_2. A very small amount of the oxygen set free will show demonstrative bubbles, sufficient to establish the diagnosis. When the fact of a free channel has been established the ordinary peroxid can be used in a small syringe with impunity, and without possibility of the calamitous consequences we have had depicted.

As to the treatment of the "blind" abscess, I should like to say "amen" to what was said by Dr. Arthur Black, as to the surgical necessity in many cases of making an opening through the alveolar wall to the end of the root. One might as well try to clean a room by sticking a broom through the transom of a door, as to cure the cases he describes by medication through the hair-sized and often indeterminate root canal.—Garrett Newkirk, in *Review.*

SALT BAGS IN THE LABORATORY.—Keep one of these bags for waste rubber dam; when you have filled it give the whole thing to the small boy. He will effect a sale at a good figure, thus keeping his "pin fund" in a more or less plethoric condition.

Reserve another for the scraps of soap that accumulate rapidly and expensively in the would-be clean office. When rolled tightly in the bag they "suds" readily and make an ideal cake for hand washing after handling flasks, bolts and other dirt-imparting appliances of the outfit of the dental laboratory.

Have one also for scrap wax. When filled, tie the neck of the bag and immerse in hot water. The wax filters through the mesh, leaving extraneous matter within the bag, which may then be committed to the furnace or ash can.—*Dental O. and Lab.*

A DENTAL DISPENSARY.—The Manhattan Odontological Society recently sought authority from the New York State Board of Charities to start a dental dispensary where the needy might receive any and all treatment, for dental troubles at an average cost of twenty cents per treatment, including fillings, crowns, etc. A member of the New York dispensary strongly disagreed with the idea of making such a charge, claiming that to do so would result in the new institution being conducted at a profit. He proceeded to state that an amalgam filling could not cost more than two cents and one of cement about the same, while gold could be supplied at an average of 65 cents per filling. His idea in making these criticisms was simply to eliminate the profit-making side of the plan so that the poor might obtain the benefit of absolutely the lowest charges.

If the idea is consummated the sponsors believe they can carry on the institution for about $3,000 per year, the stipulation being made that none but experienced dentists shall be employed and that students shall have no place in its conduct.

NECESSITY FOR PROPHYLAXIS.—The rough filling, the still rougher projection therefrom, the rough plate that fits not and is never cleaned, the wide, gapping interdental space which bespeaks the operator's inadequate consideration of the necessity to separate and to restore; the lacerated, the mangled interdental gingiva, necrotic from putrescent bits of many a morsel sequestered from viands gone, unmasticated and uninsalivated to weaken and make as prepared soil a long abused stomach for the reception of the streams of pus that must follow; the knife-edge of the shell crown that presses down like a crown of thorns, though its aureous luster and shapely form may charm the eyes of the empiric and the patient; teeth drifting and twisting and straggling from their alignment and occlusion and enveloped in calculus and gingiva as in sack-cloth and ashes, leaning and helpless, like moss-grown tombs left to the memory of fellows borne away in the cold embrace of the forceps of steel—these are some of the many conditions that must be guarded against, when opportunity permits, or met, and bravely met, by every dentist who truly worships at Hygeia's oft-neglected shrine.—J. H. CROSSLAND, in *Brief.*

A DIPLOMATIST.—Mamma—Now, Jimmie, remember the dentist said you'd ruin your teeth if you ate so much candy.

Jimmie—But Uncle Bob said that was nonsense.

Mamma—Don't you think the dentist knows more about it than your Uncle Bob?

Jimmie—Well, there's only one way to prove which one is right.

AMPUTATING ROOT ENDS.—Dr. M. I. Schamberg, in the January *Cosmos*, describes his method of amputating root ends from chronic abscessed teeth. He uses a large spear-shaped bur with four blades, which he recommends shall be run rapidly, and claims to be able to cut through the gum, process and root in about one minute, making it practicable to amputate the root end under anesthesia with nitrous oxid. The advantages claimed are that no portion of the root is left, as may be the case if a small fissure bur is used, which renders it possible to lose the amputated end in the necrotic pocket. He advises the use of the radiograph to determine the extent of the necrosis, and insists that all necrotic tissue shall be curretted away after the operation of amputation. The wound is packed with iodoform gauze for one day, when it will be possible to inspect the wound and determine the completeness of the operation. The time necessary for healing will depend on the extent of the disease and consequent loss of tissue, and will vary from a month to a year or more. The filling of the canals is best done after the amputation, as there will be greater probability of thorough disinfection and canal filling.

HISTORY RELATING TO THE TOOTHBRUSH.—Toothbrushes when first introduced were regarded as by no means important accessories to the toilet, but rather as minor luxuries, and suitable for women only.

The diary of a London merchant trading to the colonies has this entry:

"Bought a toothbrush for my wife, which, used, together with salte water, very strong, and a wasshe of Herbs, she is told will keep her Teethe from falling out or getting hollowe. The salte and Herbes may well prove strengthening to her Gummes, wch. are tender, but for the brush, it seemes but a silly Toy, hardly like to ware the worth of its price and scarce cleanley save when new. But she must have it, being a new thing late from France."

In the famous collection of the letters of the Verney family, as well, the toothbrush is referred to as "an elegant trifle, now used by the ladies of Paris."

But when Sally Annis, a colonial belle, wrote of it to her sister she had, like the London merchant's wife, good hopes of its proving of more than trifling value. Her seafaring father had just brought her one, along with other gifts.

"Besides these, and ye smalle combe, he brt. me a new mouth-brush made of eyvory," she wrote, "the back parte inlayed very pretty with silver; and yet brissles long and stiffe and sett very firm; wch he is assured will help me of my Tooth Akes: wch. you will guess deer Judy I do pray it may."

NEW PROPERTY OF ALUMINUM.—A German investigator has discovered an exceedingly valuable and important property of aluminum, which consists in its application as a whetting agent, the effect produced on cutlery set with it being most astonishing. Though a metal, aluminum possesses the structure of a fine stone, has a strong dissolving power, and develops, upon use for honing, an exceedingly fine metal-setting substance of greasy feel, while showing great adhesion to steel. The knives, etc., treated with it quickly obtain such a fine, razor-like edge that even the best whetstone cannot produce a like result. Thus, knives which had been carefully set on a whetstone, when magnified a thousand times, still exhibited irregularities and roughness on the edge, while the edge of knives sharpened on aluminum, upon exactly the same magnification, appeared as a straight, smooth line.—*Scientific American.* (*D. O. & L.*)

SOLDERS GLASS.—Mr. Charles Margot finds that an alloy composed of 95 parts of tin and 5 of zinc melts at 200 degrees, and becomes firmly adherent to glass, and, moreover, is unalterable and possesses a beautiful metallic luster; and, further, that an alloy composed of 90 parts of tin and 10 of aluminum melts at 390 degrees, becomes strongly soldered to glass, and is possessed of a very stable brilliancy. With these alloys it is possible to solder glass as easily as it is to solder two pieces of metal. It is possible to operate in two different manners. The two pieces of glass to be soldered can either be heated in a furnace and their surface rubbed with a rod of solder, when the alloy as it flows can be evenly distributed with a tampon of paper or a strip of aluminum, or an ordinary soldering iron can be used for melting the solder. In either case, it only remains to unite the two pieces of glass, press them strongly against each other, and allow them to cool slowly.—*Stomatologist.*

TEMPERAMENTAL CHARACTERISTICS OF TEETH.—Art, as applied to the making of artificial dentures, consists in the closest possible imitation of nature. This is an intricate matter requiring patient observation, close study, and the acquirement of great skill. There is no general formula for making artistic artificial dentures. Neither is there any special type of artificial dentures which may be called artistic. Nature is infinite in her variety. She never produces two beings exactly alike; every complete piece of her handiwork differs in some particular from every other piece. And yet she has a consistent plan for everything she creates; each of its parts is significant; all taken together are in harmony.

In endeavoring to imitate nature, the creator of artificial dentures must study carefully the individual variations of his patients, and it will be well for him if he also familiarize himself with the truth that while individuals differ, there is still an underlying unity of plan in their structure. From this it follows that individuals of a certain type have certain common peculiarities; while individuals of another type have certain other prominent peculiarities.—IRA BENSON SELLERY, *Northwestern Dental Journal.*

ARTISTIC ARTIFICIAL DENTURES.—There is never perfect regularity in natural teeth. Irregularity of alignment is the rule. Artistic dentistry will not be satisfied with mere anatomical correctness and perfect adaptation to mastication and speech. Each tooth must be perfectly adjusted to its function and position in the mouth. Possibly it may involve—and this is perfectly true—the rotating or elongation of the centrals, the rotation or shortening of the laterals, sometimes the rotation of the canines. Much care should be taken to see that the neck of the canine is made prominent, and that the canine eminence at the junction of the labial and buccal aspects is also well defined. This will help to restore the lost features of expression possibly more than anything else that can be done.

THE TOOTHPICK EVIL.—The American toothpick is largely responsible for many gingival lesions. There is an abnormal condition present when the use of a toothpick becomes a necessity. Food has found a way to lodge distressingly between the teeth, and the person so afflicted should seek the services of a dentist for a correction of the evil, and not keep picking with a toothpick for mere temporary relief. Usually the dentist will find that one or both of the teeth between which the trouble occurs are more or less decayed. In filling such teeth the defect—i. e., the lodgment of food—may be corrected if due attention be given to proper restoration of the points of contact. If a pocket has been already formed in the alveolus, it should be treated until health is restored; but it must be noted that rarely or never does new process, with its overlying gum, build up to original and normal outlines. It does well to fairly eliminate the depression or pocket, without building up rounded-out proportions. The eschar may be healthy, but there is loss of tissue that will not be regenerated to former outlines.—R. B. TULLER, *American Dental Journal.*

NEURALGIA AND NEURITIS.—The literal meaning of neuralgia is "nerve pain," and strictly speaking the term is a name for a symptom, rather than for a disease. Yet custom has sanctioned its use in the latter sense, and the convenience of the term is its justification. There is, however, much looseness in its application, some authors distinguishing so-called "idiopathic" or essential neuralgia from "symptomatic" or secondary neuralgia. The meaning of these terms is obvious; essential neuraligia is the sort is often transient or paroxysmal, often migratory, and apparently not due due to actual organic change in the nerves; while secondary neuralgia is permanent and persistent, being confined to a single nerve trunk or nerve which is often transient or paroxysmal, often migratory, and apparently not which microscopically shows definite signs of inflammation or degeneration. Evidently only the former or essential neuralgia is true neuralgia, and to the second form the term "neuritis" should be applied. Thus, sciatica is not truly a neuralgia, and the increasing tendency is to call that disease very properly sciatic neuritis.—CHARLES LOUIS MIX, *Northwestern Dental Journal.*